

# FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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## Flight.

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## EDITORIAL COMMENT.

**Khaki Armlets for Non-Shirkers.** For many months, dating back to December of last year, we have in "FLIGHT" advocated the distinguishing of the non-shirkers from the shirkers in regard to the British services in the present world's war. Official badges, in some directions, were issued in due course, and before long the country was swamped with buttons and emblems of all sorts and descriptions, some issued by responsible firms, and many others by very much the reverse of responsible people, until the whole business became farcical in its application. Latterly, therefore, for this reason there have been far less of those shirker-shields in evidence, as most of the decent men legitimately entitled to carry the real "war badge" in their button-holes became "shirkers" in another direction. They naturally shirked being classed with the fraudulent article, and therefore discarded the emblem altogether, which should, if properly restricted in its use, have carried with it the right of respect which every man doing his duty to his

country is entitled to demand. Months ago this state of affairs was commented upon by us and a remedy suggested in the form of a khaki armlet to be issued only by the proper authorities to those who were *really* entitled to wear them. All other badges and buttons would thereby speedily be brought into contempt, and the wearers thereof be open to the deserved opprobrium of their fellows. It is, therefore, with considerable satisfaction that we received the notification this week of the issue of the khaki armlets under Lord Derby's recruiting scheme, as, in a measure, this meets our original proposal.

The classes of men to whom these are to be issued by the Secretary of State for War are:—

1. Men who enlist and who are placed in groups awaiting the call to join the Colours.
2. Men who offer themselves for enlistment and are found to be medically unfit.
3. Men who have been invalided out of the service with good characters or who have been discharged not likely to become efficient on medical grounds.

There will be a distinct mark for each of the classes. The armlets are in process of manufacture, and notice is to be given when they can be issued, together with instructions as to issue.

But in one respect the above scheme is fatally weak, we consider. There should be *one* armlet only—not three, as proposed. The issue of graded khaki armlets is likely to lead to many cases of resentment, especially with those who have long since willingly offered themselves for enlistment but have been refused on account of physical unfitness. Why should such men be called upon to carry upon them the badge of infirmity for all the world to note—no matter what that infirmity may be? Injustice would thereby result in a very large number of cases, as, without question, there would be a strong disinclination to wear such an emblem of "distinction." Once a man has placed his services for good or ill at the disposal of his King and country, it should be all-sufficient for that fact to be made apparent to all whom it may concern. The why or wherefore of his not being wholly in khaki should not be the business of his fellow-citizen to enquire into. It is sufficient that he is entitled to display the khaki armlet of honour, and let it go at that. If there is any distinction to be made at all it should only be in favour of the man who has gone one step further than the rest of the armlet wearers—the man who has been out at the front fighting, and who has, from wounds or other causes, been invalided back into mufti as no longer fit, in a military sense, to continue fighting in the world struggle for the

cause of civilisation. There is added honour in such distinction, but it is ungenerous to label a man who happens to be "unfit" in some minor degree, such as imperfect eyesight, &c., although physically fit in a general sense, so long as he is willing to do his bit of fighting with the rest. We shall hope, therefore, if it be not too late, that, in this respect, the principle guiding the issue of the armlets will be re-considered. Otherwise there can be nothing but praise for the move which has been made to distinguish the goats from the sheep.

## Limited Neutrality.

We do not doubt but that if a plunge one side or the other has ultimately to be taken, the Dutch people will plump for the *Entente* combination. That their present position in the Continental complications is anything but a pleasant one we can well believe, and their endeavour to officially keep clear of unneutral acts is but natural, whatever individual traders may be doing in the form of trading with our enemy. It would appear, however, as if it were about time for the Dutch Government to take up a firm position in regard to the violation of their "territorial" rights in the air by the passage of German airships over their boundaries. Whilst quite recognising that there are grave difficulties in their way of putting a stop by physical force to these contemptuous tactics of the Germans, at least they have in a modified degree a retaliatory remedy to hand. Following representations by the German authorities, the Dutch authorities have ceased notifying this country of the sailing of German airships over the North Sea, by reason of it being claimed by the Germans that such notification is a breach of neutrality. So far, good; and this side we have therefore to do the best we can to be prepared for the Zeppelin visits as they materialise. But surely it is about time that representations from our Government should be made to our Dutch friends that, as the Germans persist in passing over Holland as being the most convenient and shortest way *en route* for Britain, the obligation on the part of the Dutch authorities not to notify us of such passing over neutral territory should cease to be respected until such time as the German command itself undertakes to respect the neutrality of its neighbour. Two wrongs do not, of

course, make one right, but at least no complaint by the Hun Government could then hold good against such a justifiable counter-claim. Let our newly-formed "Inner War Cabinet" look to it.

## Sir John French's Appreciation.

Since the middle of June there has been no despatch from Sir John French setting out the considered views of the happenings "out yonder," until the lengthy *resumé* issued last Monday. The unstinted praise of the work of the R.F.C. men meted out by the Commander-in-Chief in France will still be in the minds of our readers, and, as we then anticipated, that praise is not only more than upheld in the new despatch of Sir John, but is, if anything, elaborated. It is difficult to find the dividing line between the admiration which he expresses for both the Artillery and the Flying Corps—they appear to be two working as one—and no greater commendation could be apportioned to them than this recognition of their combined efficiency.

It is clear that again the work of the R.F.C. as a whole has still further impressed its mark upon the method of operations at the front, whilst the many individual instances of brilliant exploits have brought the Corps to a point of eminence with the Commander-in-Chief which promises well for days to come during the war—and thereafter. "The volume of work steadily increases; the amount of flying has been more than doubled during this period (in review), there have been more than 240 combats in the air, and in nearly every case our pilots have had to seek the enemy behind his own lines, where he is assisted by the fire of his movable anti-aircraft guns," etc., etc. This is homage indeed from one who is not given to overstating his case. Hardly wonder that the Royal Aero Club pilots' list is just soaring to the 2,000 mark, when such possibilities of distinction are open to men of nerve and resource. Its further vast expansion is but a matter of the opportunity for acquiring the necessary proficiency. Time will supply that factor, and in the meantime the "waiting" list for gaining that proficiency is ever on the increase; so that we may look forward with the utmost confidence to the spreading of the interests concerned with aviation and the ever-extending importance of the Royal Aero Club as its governing head.

## The Defence of London.

QUESTIONED in the House of Commons on October 28th, regarding the steps being taken to safeguard the lives of the citizens of London, Mr. Balfour, First Lord of the Admiralty, said that the defence of London, whether by guns or aeroplanes, was a subject of anxious study and was undergoing, he hoped, constant improvement.

Asked by Mr. Annan Bryce whether he had made himself acquainted with the steps taken to safeguard Paris, Mr. Balfour said the answer was in the affirmative. He also said that he was quite aware that Paris was nearer to the German lines than London, but that did not settle the question. There were many other considerations, and he would remind them that Zeppelins were not kept in the German lines. Where a Zeppelin came from depended on the power of accommodation, which was a very costly and difficult matter, and the Allies, he was glad to say, had been so fortunate in their attacks on Zeppelin sheds in the Low Countries that it was not now a favourable place for the enemy to put their Zeppelins.

Sir Percy Scott's duties were primarily with the gun defence of London. There was, as explained the other day, full co-operation between the gunnery defences of London and the naval and military flying services.

Replying to Mr. Outhwaite, Mr. Balfour said that the Admiralty were dependent for their earliest information about Zeppelins on observations made at the coast and possibly by cruisers or other vessels at sea. It should be remembered that the fact that a

Zeppelin has been seen approaching the coast or moving inland is no conclusive proof of a raid on London.

In reply to another question, Sir John Simon said he thought it would give rise to much unnecessary anxiety and alarm if the names of victims of raids were published without the addresses which would distinguish the persons killed or injured from other persons having similar names; and addresses could not, of course, be given. When persons were killed or injured in such circumstances that their friends were not aware of it at the time, the earliest possible intimation was given to the friends by the police.

Replying to questions asked on Tuesday by Mr. R. McNeill as to how far Sir Percy Scott's authority extended, Mr. Balfour said that Sir Percy Scott's duties were concerned primarily with the gunnery defences of London against attack by enemy aircraft. But it must not be supposed that the co-ordination between the several services mentioned was incomplete or that the requirements of the anti-aircraft department of the Admiralty were not regarded as decisive and promptly met.

If we were arranging for the protection of London in peace time against aircraft and other attacks we should, no doubt, put it under a military governor, as is the case in Paris, but he thought the idea of so colossal a reorganisation at this moment would cause a great deal more confusion for some time at least than any advantage which would be secured.



"Flight" Copyright.

CIRCLING AT HENDON.—Mr. Marcus D. Manton in the G.-W. Scout. In the distance one of the Beatty-Wrights.



## AIRCRAFT WORK AT THE FRONT.

### OFFICIAL INFORMATION.

#### British.

*General Headquarters, Oct. 27th.*

"Our flying officers brought down two German aeroplanes yesterday, one falling in our lines and the other close behind the enemy's front trenches."

#### Russian.

*Petrograd, Oct. 28th.*

"Yesterday our fleet in the Black Sea bombarded the port of Varna with heavy guns, while bombs were dropped by seaplanes. The bombardment, which lasted about an hour, damaged the harbour works and sheds and the coast batteries. The town itself was not hit. According to observations made by seaplanes our fire was extremely accurate . . . .

"As regards the achievements of our aviators, it is reported that during the action they dropped 21 bombs in the vicinity of the harbour. The aviators were subjected to a terrific fire, but none of them was hit, and all the seaplanes returned safe and sound."

*Petrograd, Oct. 30th.*

"South of Baranowitchi, in the region of Gorodischtsche, our artillery brought down a German aeroplane, which fell in our lines. Both the pilot and the observer were taken prisoners."

*Petrograd, Oct. 31st.*

"On the Western front one of our Ili Murometz battle aeroplanes threw bombs on the station of Tauerkaln, south-west of Friedrichstadt. Other machines dropped bombs on convoys of enemy troops in the region of Mitau and Schoenberg, south-west of Tauerkaln."

*Petrograd, Nov. 1st.*

"In the Gulf of Riga one of our torpedo-boats brought down a German seaplane. The aviators were captured."

#### Italian.

*Rome, Oct. 29th.*

"Our aviators made numerous raids yesterday over the Rainizza plateaux and the Carso front, dropping bombs at several points on the Vallebeca (Idria) railway,

on the Gorizia-Trieste railway, and also upon enemy camps, as well as marching columns. Notwithstanding the very active fire of numerous anti-aircraft batteries our aviators returned safely."

*Rome, Nov. 1st.*

"Our aviators continue their daring incursions with success. Yesterday they again bombarded numerous military objectives, among them the railway stations of Dino and Nabresina and trains at the latter place."

#### German.

*Berlin, Oct. 27th.*

"In an aerial fight Lieutenant Ingelmann shot down a fifth enemy aeroplane, which was a French biplane carrying English officers, who were taken prisoners. Two other enemy aeroplanes were brought down behind the enemy lines. One was completely destroyed by our artillery the other day to the north of Souchez."

*Berlin, Oct. 30th.*

"A Russian battle-plane was shot down near Kukli."

*Berlin, Nov. 1st.*

"Lieutenant Boelcke brought down a French biplane south-east of Tahure on October 30th, and has thus put his sixth enemy aeroplane out of action. Several aerial battles took place in the neighbourhood of Belfort, with good results for the German aviators."

#### Austrian.

*Vienna, Oct. 29th.*

"An Italian aviator bombarded the Castle of Miramar."

*Vienna, Oct. 31st.*

"South-east of Luck another enemy aviator was shot down."

#### Bulgarian.

*Sofia, Oct. 29th.*

"On the 27th the Russian Black Sea fleet, at least twenty units strong, appeared off Varna, which was bombarded for two hours. At the same time three hydroplanes dropped bombs on the town. One enemy airman was hit."

#### Sir John French and the R.F.C.

IN the despatch from Sir John French dated October 15th, and covering the period from June 15th, which was issued by the War Office on Monday, there were the following references to the work of the R.F.C. Referring to the attack on September 25th, it is stated:—

"The Wing of the Royal Flying Corps attached to this Army (Third) performed valuable work by undertaking distant flights behind the enemy's lines and by successfully blowing up railways, wrecking trains, and damaging stations on his line of communication by means of bomb attacks. . . .

"Heavy rain fell throughout the day, which was very detrimental to efficient observation of fire and reconnaissance by aircraft."

Dealing with the work of the Royal Artillery, it is stated:—

"The work of the Artillery in co-operation with the Royal Flying Corps continues to make most satisfactory

progress, and has been most highly creditable to all concerned.

"I would again call your Lordship's attention to the work of the Royal Flying Corps.

"Throughout the summer, notwithstanding much unfavourable weather, the work of co-operating with the Artillery, photographing the positions of the enemy, bombing their communications and reconnoitring far over hostile territory has gone on unceasingly.

"The volume of work performed steadily increases; the amount of flying has been more than doubled during this period. There have been more than 240 combats in the air, and in nearly every case our pilots have had to seek the enemy behind his own lines, where he is assisted by the fire of his movable anti-aircraft guns; and in spite of this they have succeeded in bringing down four of the German machines behind our trenches and at least twelve in the enemy's lines, and many more have been seen to dive to earth in a damaged condition or to have retired from the fight. On one occasion an officer of the Royal

Flying Corps engaged four enemy machines and drove them off, proceeding on his reconnaissance. On another occasion two officers engaged six hostile machines and disabled at least one of them.

"Artillery observation and photography are two of the most trying tasks the Royal Flying Corps is called upon to perform, as our airmen must remain for long periods within easy range of the enemy's anti-aircraft guns.

"The work of observation for the guns from aeroplanes has now become an important factor in artillery fire, and the personnel of the two arms work in the closest co-operation.

"As evidence of the dangers our flying officers are called upon to face, I may state that on one occasion a machine was hit in no fewer than 300 places soon after

crossing the enemy's lines, and yet the officer successfully carried out his mission.

"The Royal Flying Corps has on several occasions carried out a continuous bombing of the enemy's communications, descending to 500 ft. and under in order to hit moving trains on the railway. This has in some cases been kept up day after day; and, during the operations at the end of September, in the space of five days nearly six tons of explosives were dropped on moving trains, and are known to have practically wrecked five, some containing troops, and to have damaged the main railway line in many different places.

"For the valuable work carried out by the Royal Flying Corps I am greatly indebted to their commander, Brigadier-General H. M. Trenchard, C.B., D.S.O., A.D.C."

### More Rewards for R.F.C. Officers.

In the *London Gazette* of the 29th ult. it was announced that His Majesty the King had been graciously pleased to confer the undermentioned rewards for distinguished service in the field:—

#### To be Brevet Major.

Captain (Temporary Major) H. L. REILLY, 82nd Punjabis and Royal Flying Corps.

Captain A. J. Ross, R.E., attached Royal Flying Corps.

#### Awarded the Military Cross.

Lieutenant (Temporary Captain) GILBERT BRAITHWAITE RICKARDS, Royal Flying Corps, Special Reserve.

It was also announced that His Majesty the King had been graciously pleased to confer the Military Cross on the undermentioned officers, in recognition of their gallantry and devotion to duty in the field:—

Captain LIONEL WILMOT BRABAZON REES, Royal Artillery and Royal Flying Corps.

For conspicuous gallantry and skill on several occasions, notably the following: On 21st September, 1915, when flying a machine with one machine gun, accompanied by Flight-Sergeant Hargreaves, he sighted a large German biplane with two machine guns 2,000 ft. below him. He spiralled down and dived at the enemy, who having the faster machine, manoeuvred to get him broadside on and then opened heavy fire. In spite of this Captain Rees pressed his attack, and apparently succeeded in hitting the enemy's engine, for the machine made a quick turn, glided some distance and finally fell just inside the German lines near Herbecourt.

On July 28th, he attacked and drove down a hostile monoplane, in spite of the fact that the main spar of his machine had been shot through and the rear spar shattered.

On August 31st, accompanied by Flight-Sergeant Hargreaves, he fought a German machine more powerful than his own for three-quarters of an hour, then returned for more ammunition and went out to the attack again, finally bringing the enemy's machine down apparently wrecked.



### The Roll of Honour.

THE following casualties in the Expeditionary Force have been officially announced from General Headquarters:—

#### Undated:

##### Accidentally Killed.

Captain A. V. Newton, Somerset L.I., 3rd Batt., attached R.F.C.

Second Lieutenant A. T. Tallentire, London Regt. (T.F.), 28th Batt. (Artists' Rifles), and R.F.C.

##### Wounded.

Lieutenant S. T. L. Greer, R.F.A., 6th London Brigade (T.F.) and R.F.C.

Second Lieutenant W. A. W. Hallam, A.S.C., attached R.F.C.

Second Lieutenant J. L. Williams, Royal Flying Corps.

##### Missing.

Captain C. C. Darley, R.F.A. and R.F.C.

Second Lieutenant W. G. Lawrence, 3rd Oxford and Bucks L.I., attached R.F.C.

Temporary Second Lieutenant HENRY BAYLEY REGINALD GREY-EDWARDS, Royal Artillery and Royal Flying Corps.

For conspicuous gallantry and skill on September 25th, 1915, on the Phalempin-Seclin line, when he bombed a train and damaged the track from a height of 400 ft. under heavy rifle fire.

He was attacked by an enemy aeroplane, but drove it off. He also brought back a very useful reconnoissance report. This was all carried out under bad weather conditions.

Second Lieutenant SELDEN HERBERT LONG, the Durham Light Infantry and Royal Flying Corps.

For conspicuous gallantry on several occasions, notably the following:

On September 10th, 1915, he went out to attack an observation balloon shed with a 100-lb. bomb, but, being heavily fired at by an anti-aircraft battery, he silenced the guns with this bomb and returned for another one, with which he attacked the balloon. He only narrowly missed it as it was being deflated beside the shed.

On September 23rd, he made two determined attacks on trains from 500 ft., breaking the rails in two places. On the first occasion he returned to the attack three times, and finally climbed to 1,000 ft. in order to make better use of his bomb sight; on the second occasion he made most of his return journey at 1,000 ft., in order better to examine villages, roads, &c.

On September 25th he attacked a train at 500 ft. under heavy rifle fire, and damaged the line.

Late in the afternoon of September 25th, he heard that trains were moving at 25 miles distance, and, in spite of darkness and bad weather, he volunteered to attack them. Heavy rain prevented his reaching them, so he turned to attack Peronne Station, descending to 500 ft. and coming under heavy anti-aircraft gun fire. This fire prevented his reaching the station, but he climbed to 1,500 ft. and attacked a "Rocket" battery, silencing one of its guns.

Second Lieutenant DOUGLAS ARCHIBALD COLQUHOUN SYMINGTON, Royal Flying Corps, Special Reserve.

For conspicuous gallantry and skill on September 26th, 1915, when he demolished part of a train which was moving towards St. Amand by bombs dropped from a height of 500 ft. A large portion of the train was completely wrecked, and he observed dead horses thrown out of it by the explosion. The remainder of the train was unable to proceed.



Captain C. H. Marks, Royal Flying Corps.

Second Lieutenant R. J. Slade, Army Cyclist Corps, attached R.F.C.

It has been unofficially announced that Captain Marks, of the 13th Squadron R.F.C., was killed in an aerial fight in France on October 23rd.

It has also been unofficially reported that Captain B. T. James, R.E., attached R.F.C. (officially reported missing), was killed in action on July 13th near Hooze, and that Second Lieutenant J. Gay, of the Royal Flying Corps, was killed in a fight in the air on October 10th while taking photographs over the German lines.



### Australia's Military Aeroplane.

ACCORDING to messages from Australia the first aeroplane built at the Commonwealth Military Flying School at Werribee, Victoria, has been completed, and successfully flown by Capt. Eric Harrison, who will be remembered for his work with the British company.



## THE BRITISH AIR SERVICES.

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

### Royal Naval Air Service.

THE following appeared among the Admiralty announcements of the 22nd ult. :—

Naval Instructors T. Slator, B.A., R. H. Whapham, M.A., B.Sc., and R. R. Cummings, M.A., to the "Pre-ident," additional, for Eastchurch, Chingford, and Kingsnorth Air Stations respectively. All to date Oct. 20th.

The following appeared among the Admiralty announcements of the 28th ult. :—

Sub-Lieut. (R.N.V.R.) R. G. Shire (temporary) promoted to Lieutenant (R.N.V.R.), with seniority of Oct. 25th.

The following entries have been made:

Probationary Flight Sub-Lieutenants (temporary): A. E. Popham, R. J. E. S. Dawson, and P. D. Robertson, all with seniority of Oct. 30th, and appointed to "President II," additional, for R.N.A.S.

Lieutenants (R.N.V.R., temporary): I. K. H. Locke, J. A. Holder, and A. F. Sidgreaves, all with seniority of Oct. 27th, and appointed to "President," additional, for R.N.A.S.

Sub-Lieutenants (R.N.V.R., temporary): Chief Petty Officer E. Chodwick (R.N.), with seniority of Oct. 26th, and appointed to "President," additional, for R.N.A.S.; Chief Petty Officers G. H. Unwin, H. Bedford, H. N. Speight, S. A. Hickson, P. G. Silley, and J. Paxton, with seniority of Oct. 26th, and appointed to "President," additional, for Anti-Aircraft Corps.

The following appeared among the Admiralty announcements of the 30th ult. :—

G. F. Meager, A.B. (R.N.V.R.), entered as Probationary Flight Sub-Lieutenant (temporary), with seniority of Oct. 29th, and appointed to "President," additional, for R.N.A.S.

E. Nixon (Sec. Corporal) and J. D. Moffat both granted a temporary commission as Lieutenant, R.M., with seniority of Oct. 4th and 28th respectively, for service in the Divisional Engineers, R.N. Division.

The following appeared among the Admiralty announcements of the 1st inst. :—

Paymaster H. A. Michell graded as Flight-Commander, with seniority of May 7th, and appointed to "Pre-ident," additional, for duty in Air Department, temporary, Oct. 29th.

The undermentioned have been entered as Probationary Flight Sub-Lieutenants (temporary) with seniority as follows, and all appointed to "President," additional, for R.N.A.S.: R. J. McDougall, Oct. 4th; G. H. Simpson, D. Whitier, A. B. Shearer and L. W. Nurse, all Oct. 6th; H. D. Smith, A. T. O. Mann, and A. L. Melhado, all Nov. 6th; G. W. Biles, H. L. Hitch, W. Hecking, A. N. Robinson, W. R. M. Hill, E. G. O. Jackson, J. F. Dixon, J. R. Crouch, E. C. H. Tebb, B. W. Hemsley, and M. A. Lovell, all Nov. 7th.

The following appeared among the Admiralty announcements of the 2nd inst. :—

G. M. Kingsmill entered as Probationary Flight Sub-Lieutenant, for temporary service, with seniority of Nov. 1st, and appointed to "President," additional, for R.N.A.S.

Temporary Sub-Lieut. (R.N.V.R.) H. C. Woodward to "President," additional, for R.N.A.S. Nov. 1st.

The following have been granted temporary commissions as Lieutenant (R.N.V.R.), with seniority of Nov. 1st, and appointed to "President," additional, for R.N.A.S.: M. H. P. Allen, S. M. Harding and W. Hallett-Carpenter.

### Royal Flying Corps (Military Wing).

THE following appeared in the *London Gazette* of the 22nd ult. :—  
*Flying Officers.*—Sept. 28th: Temporary Second Lieut. R. J. Lillywhite, General List; Temporary Second Lieut. C. Foggin, General List.

### A Third Aeroplane from Rhodesia.

THE British South Africa Company has received a cable message from the Administrator of Southern Rhodesia requesting it to place at the disposal of the Secretary of State for War the sum of £1,500 deposited with the Treasury at Salisbury for the purchase of an aeroplane as a gift to the Royal Flying Corps by the inhabitants of Gatooma, Southern Rhodesia, who ask that the aeroplane may be named "Gatooma."

*Assistant Equipment Officers.*—Second Lieut. M. D. McFarlane, Middlesex, and to be seconded; Sept. 8th. Second Lieut. E. S. Bramham, S.R.; Sept. 15th. Second Lieut. T. W. Winter, S.R.; Sept. 22nd. Lieut. Hon. M. Baring, S.R.; Sept. 27th.

The following appeared in a supplement to the *London Gazette* issued on the 27th ult. :—

*Supplementary to Regular Corps.*—Second Lieutenant (on probation) Harold W. Butterworth is confirmed in his rank.

The following appeared in a supplement to the *London Gazette* issued on the 28th ult. :—

*Supplementary to Regular Corps.*—Second Lieutenants (on probation) confirmed in their rank: Victor D. Bell, Alfred B. Adams, and Beaufoi J. Moore.

The following appeared in the *London Gazette* of the 29th ult. :—

*Flying Officers to be Flight-Commanders.*—Temporary Second Lieut. M. K. Cooper-King, General List, and to be Temporary Captain whilst so employed; Sept. 29th. Temporary Captain P. Babington, Hants (T.F.); Oct. 2nd. Oct. 14th: Capt. F. G. Small, Connaught Rangers; Capt. J. R. Howett, S.R. And to be Temporary Captains whilst so employed. Oct. 14th: Lieut. E. M. Murray, Q.V.O. Corps of Guides (F.F.) (Lumsden's), I.A.; Lieut. C. W. Anstey, S. Wales Borderers; Lieut. F. E. Hellyer, Hants (T.F.); Lieut. D. R. Hanlon, R.A.; Lieut. C. M. Crowe, S.R.; Lieut. G. C. N. Nicholson, S.R.; Lieut. S. T. Saunderson, N. Irish H., S.R.; Lieut. H. L. Cooper, S.R.; Lieut. F. H. Jenkins, S.R.; Lieut. H. R. Nicholl, S.R.; Second Lieut. L. A. Patinson, R.F.; Second Lieut. J. O. Cooper, S.R.; Second Lieut. E. H. Mitchell, R.A.

*Flying Officers.*—Lieut. C. H. Awcock, R.A., and seconded; Sept. 23rd. Oct. 7th: Lieut. L. H. Sweet, Hants, and seconded. Second Lieut. W. A. Summers, 18th Hussars, and seconded; Second Lieut. F. W. Stent, S.R.; Temporary Second Lieut. W. R. E. Harrison, E. Kent, and transferred to General List; Second Lieut. G. de L. Wooldridge, S.R. Lieut. J. H. Simpson, 5th Can. Inf. Batt.; Oct. 12th. Oct. 16th: Second Lieut. E. M. Pollard, W. Yorks. (T.F.); Second Lieut. V. D. Bell, S.R.; Second Lieut. A. B. Adams, S.R.; Second Lieut. B. J. Moore, S.R.

*Memoranda.*—J. R. Herbert to be Second Lieutenant for employment with Royal Flying Corps, Military Wing, Oct. 19th, 1915.

*Supplementary to Regular Corps.*—Second Lieutenants (on probation) confirmed in rank: F. W. Stent and G. de L. Wooldridge. To be Second Lieutenants (on probation): S. J. Sibley; Sept. 4th. C. S. Ross; Sept. 10th. D. Cox; Oct. 3rd.

The following appeared in a supplement to the *London Gazette* issued on the 1st inst. :—

*Flying Officers.*—Oct. 5th, 1915: Capt. A. V. Newton, Prince Albert's (Somerset L.I.), Special Reserve (since deceased), from an Assistant Equipment Officer; Lieut. W. T. F. Holland, 21st (Empress of India's) Lancers, and to be seconded; Lieut. F. F. Minchin, Prince's Patricia's Canadian L.I.; Temporary Second Lieut. A. D. Broughton, Reserve Regiments of Cavalry, and to be transferred to the General List; Second Lieut. K. H. Riversdale-Elliott, Cameronians (Scottish Rifles), and to be seconded; Second Lieut. H. W. Butterworth, Special Reserve.

*Supplementary to Regular Corps.*—Lieutenants to be Temporary Captains; Nov. 2nd, 1915: Clifford A. Hooper and Cecil H. Pixton.

Second Lieut. (on probation) Exley L. Millar is confirmed in his rank.

The following appeared in the *London Gazette* of the 2nd inst. :—

*Flying Officers.*—Oct. 12th, 1915: Temporary Lieut. C. M. Leman, R.G.A., T.F.; Temporary Second Lieut. R. Barton, King's Own (Royal Lancaster Regt.), and is transferred to the General List; Second Lieut. M. Le Blanc-Smith, Special Reserve; Second Lieut. E. L. Millar, Special Reserve.

*Supplementary to Regular Corps.*—Second Lieutenants (on probation) confirmed in their rank: Lord Hugh R. H. Gascoigne-Cecil, Algernon C. Gilling, Stanley S. Nevill, Maurice Le Blanc-Smith, Geoffrey Somers-Clarke, Hugh Tomlinson, Norman Pellew, Sidney E. Cowan, Horatio H. Bright, Bowen May.

### An Aeroplane from Trinidad.

"TRINIDAD" will be the name of the fighter air-plane presented to the Army Council by the members of the Chamber of Commerce of that island, as the outcome of a meeting convened recently by the President, Mr. W. Gordon Gordon, who contributed £800 and Mr. J. H. Smith, Vice-President, who gave £200. On their behalf a cheque for £2,250 has been sent to the War Office by the West Indies.

## CONSTRUCTIONAL DETAILS.—IX.

HAVING dealt, in previous issues, with various types of undercarriages, incorporating in their construction one or two horizontal longitudinal members, commonly termed skids, or runners, we illustrate in the accompanying sketches a different form of undercarriage in which the use of skids has been entirely dispensed with. This type, which is finding more and more favour among aeroplane designers—or perhaps it would be more to the point to say that it is becoming more popular among practical aviators, since it is the requirements of these that ultimately decide the most suitable form—is usually called the “Vee” type. From a constructional, as well as from an aerodynamical, point of view this form of undercarriage has much to recommend it, offering as it does a minimum of head resistance, and being, provided that good workmanship and suitable materials are employed, of great strength for its weight. Regarded purely as a type, the “Vee” chassis may, generally speaking, be said to be of two forms: the simplest in which the struts form a “Vee” as seen from the side, and the other having an additional pair of struts forming a “Vee” when viewed from in front. The best known example of the latter form is, perhaps, the undercarriage of the Morane-Saulnier monoplane.

As regards the materials employed in the construction of the “Vee” type of undercarriage, some manufacturers prefer steel tubes, usually streamlined, whilst others select wood for the struts. Which of these materials is the best it is of course difficult to say, since each has certain characteristics that may be in favour of or against its employment according to their nature. The all-steel “Vee” chassis is enormously strong, as it has proved repeatedly by standing up to landings which would have completely wrecked other undercarriages, but it has the disadvantage that it is comparatively expensive to make, involving a considerable amount of welding. Furthermore, in case it is damaged in a heavy landing, any separate member of the all-steel “Vee” chassis is very difficult to repair.

The wooden undercarriage, although probably not so strong as one built throughout of steel, is cheap to build and easy to repair in case of damage, and this type is therefore employed by a number of aeroplane constructors, the difference between that and the all-steel form of construction being, of course, one of detail only, the two being exactly similar in principle.

For our series of constructional details this week we have chosen the all-steel “Vee” undercarriage, of which several examples are shown in the accompanying pages of illustrations.

The Morane-Saulnier chassis, already referred to, is shown at the bottom of one of our pages. Viewed from the side it is a simple V, while viewed from in front it represents the letter M. The various members, which are streamline steel tubes, are welded together and form a structure of immense strength. At the top they are joined to steel clips gripping the lower *longerons* of the body, while at the bottom the outer members are welded together, the angle between them being filled up with a web plate, in which is a slot for the accommodation of the upward travel of the two stub axles, when running over rough ground. Below the portion of the axles that projects through this slot is a short lug to which are anchored the rubber shock absorbers. The inner pair of the four front chassis struts converge towards the centre, where they are welded together and flattened out to accommodate the two transverse

members of the chassis between which the axles move. A bolt passing through from front to back at this point keeps the apex of the inner Vee in place and serves at the same time as a pivot for the stub axles. Another constructional detail which is worth mentioning is the hollow protuberance in the angle between the centre struts, and to which the stay cables are secured by means of adjustment bolts in the manner shown in one of our detail sketches.

Somewhat similar to the Morane undercarriage is that of the Nieuport scouting monoplane that was exhibited at the last Olympia Aero Show. Some very clear illustrations of this chassis will be found on the same page as the Morane. It will be seen that instead of the inner front struts of the Morane the Nieuport has a single transverse streamline tube, the necessary lateral rigidity being obtained by means of cable bracing. A further difference will be found in the method of guiding the axle. Instead of the slotted web on the Morane a radius rod guides the axle on its upward travel, this radius rod being anchored to a lug on the front edge of the chassis strut. This arrangement, as well as the attachment of the struts to the lower *longerons* of the fuselage, are illustrated in two of the detail sketches. The third undercarriage on this page is that of the Grahame-White “pusher” biplane. It is of a similar type as the other two, but has, it will be seen, three struts on each side instead of two.

The Clement-Bayard monoplane, which was also exhibited at the last Olympia Show, had a similar type of Vee chassis, with the exception, however, that ordinary circular steel tubes were used in its construction, the necessary streamline form being obtained by enclosing the tubes in wood casings of the desired section. The two stub axles move between two transverse steel tubes connecting the apexes of the struts, and the manner in which springing is obtained by means of rubber shock absorbers is clearly shown in the detail sketch. The undercarriage of the E.A.C. biplane has been included under the heading of simple “Vee” undercarriages, since the small tusks with which it is fitted cannot be said to be skids properly speaking. They are in fact formed by a forward extension of the rear chassis struts, and are here stiffened by webs in the manner shown in the sketch.

The remaining two illustrations show the undercarriages of the Vickers scout and Ponnier monoplane. In the Vickers chassis the wheels are sprung, as shown in the sketches, whereas in the Ponnier no springing whatever is provided except that afforded by the pneumatic tyres. This last type of undercarriage may probably be said to be as simple as it is possible to make an undercarriage, and would be of little use on rough ground. It was, as a matter of fact, used on the machine flown by Emile Vedrines in the last Gordon-Bennett race at Rheims.



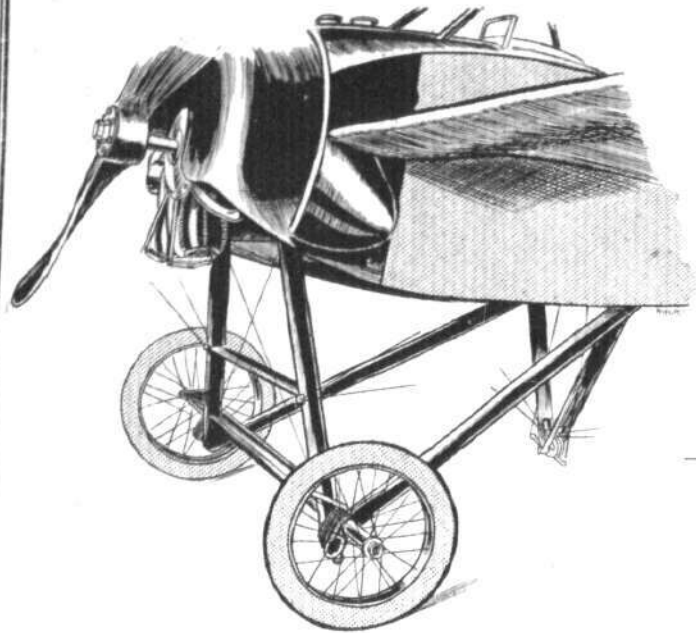
## The Flying Services Fund Reaches £10,000.

THE great interest taken by Sir Charles Cheers Wakefield in aviation affairs has again been shown by his kindly thought in ensuring that, at the start of his year of office as Lord Mayor, the Flying Services Fund should have a five-figure total. Although Sir Charles Wakefield's donation of £63 2s. brings the amount received to date to an even £10,000, it must not be imagined that there is no need for further contributions. The Fund, which is administered by the Royal Aero Club, is doing and will do splendid work in assisting officers and men of the R.N.A.S. and the R.F.C. who are incapacitated on active service, or the widows and dependents of those who are killed. Donations should be sent to the Secretary, Royal Aero Club, 166, Piccadilly, W.

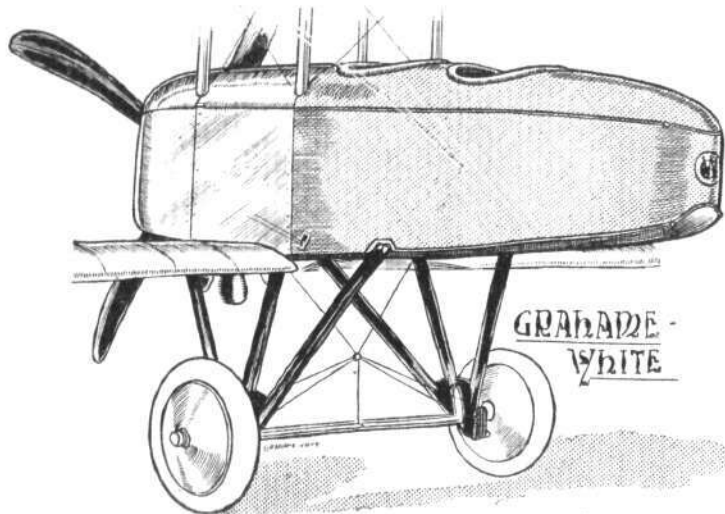
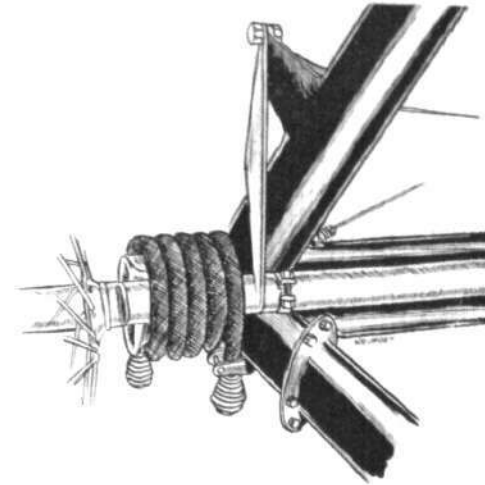
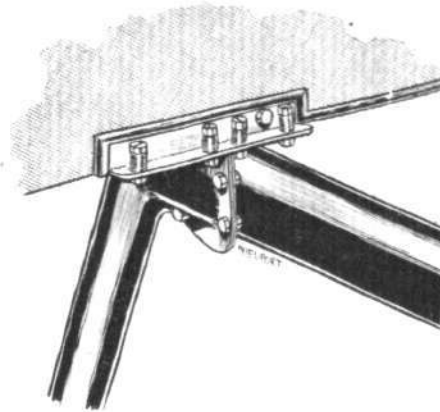


# CONSTRUCTIONAL DETAILS.—IX.

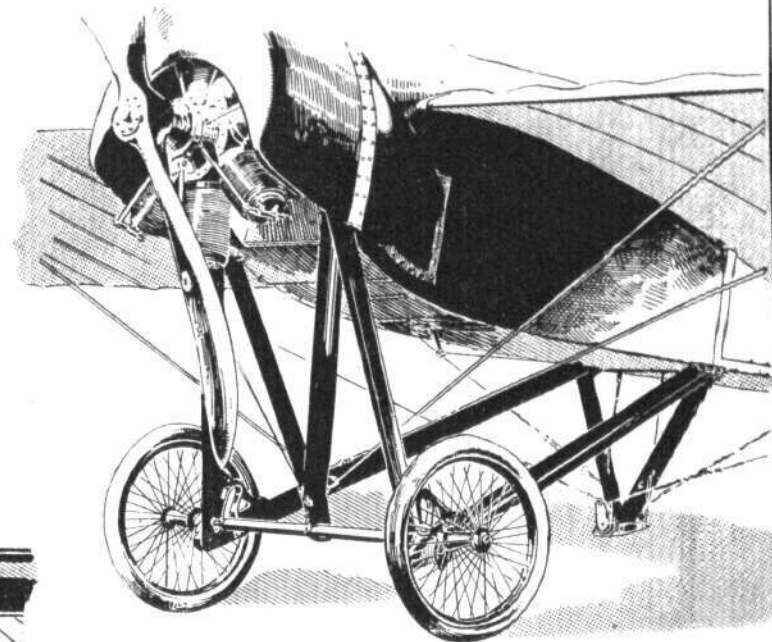
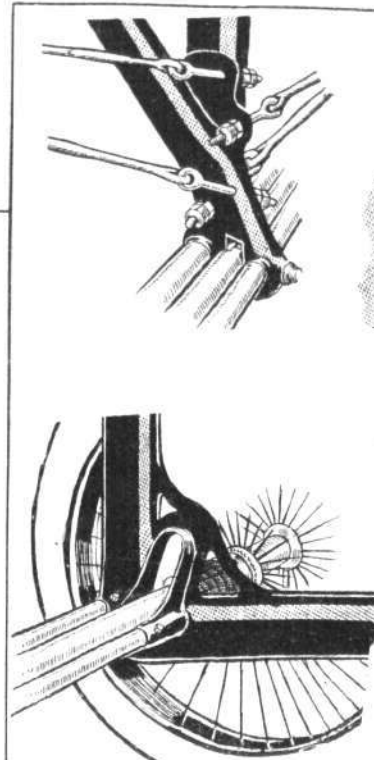
FLIGHT



— NIEUPORT —



GRAHAME-  
WHITE

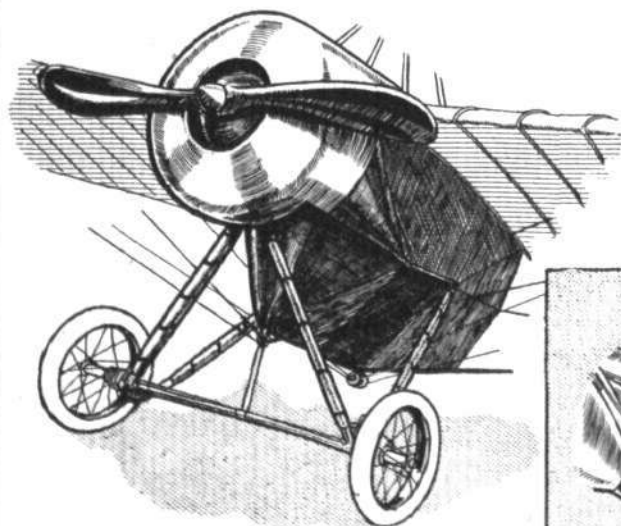


— MORANE-SAULNIER —

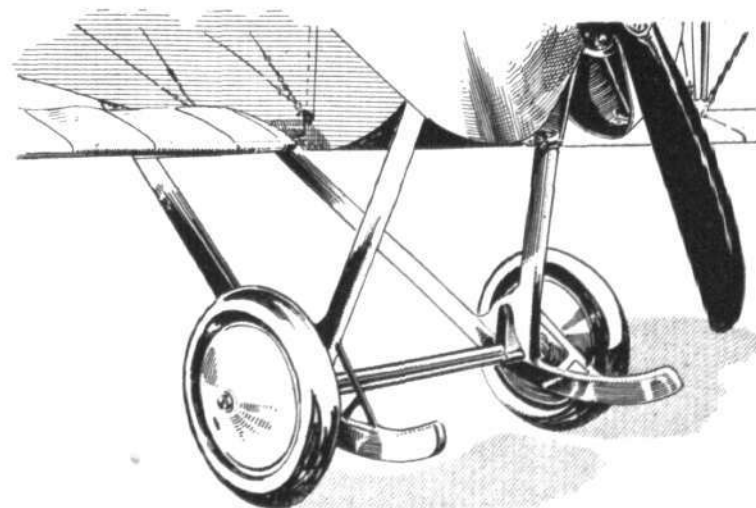
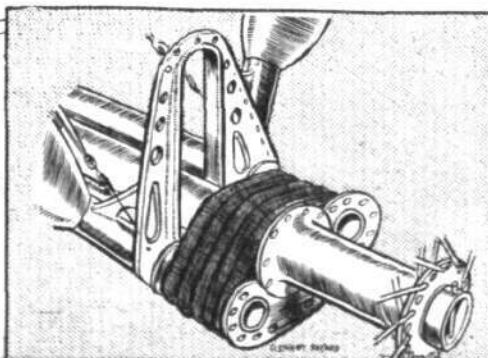
Various undercarriages of the "Vee" type. (See text page 847.)

NOVEMBER 5, 1915.

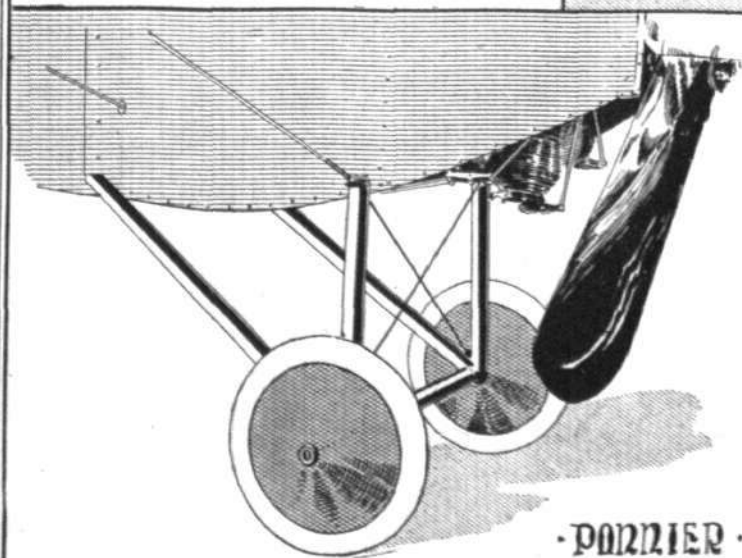




· CLEMENT-BAYARD ·

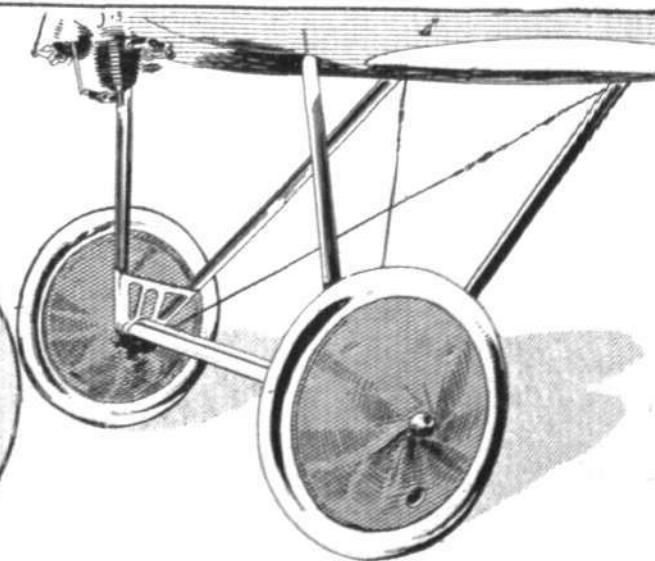
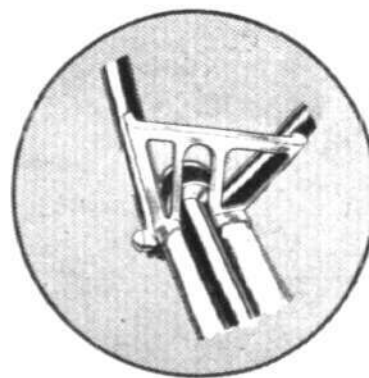


E.A.C.



· POMNIER ·

· VICKERS ·



# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

## Aviators' Certificates.

THE following Aviators' Certificates have been granted:—

- 1930 2nd Lieut. John Banks Walmsley (Maurice Farman Biplane, Military School, Farnborough). Oct. 8th, 1915.
- 1931 John Eric Northrop (L. and P. Biplane, London and Provincial School, Hendon). Oct. 17th, 1915.
- 1932 2nd Lieut. Graham Shurmur Bush (Somerset Light Infantry) (Maurice Farman Biplane, Military School, Shoreham). Oct. 20th, 1915.
- 1933 Lieut. Robert Henry Brackman Ker (48th Battalion C.E.F.) (Maurice Farman Biplane, Military School, Farnborough). Oct. 22nd, 1915.
- 1934 2nd Lieut. Columb Thomas Knox (Royal West Surrey Regt.) (Maurice Farman Biplane, Military School, Farnborough). Oct. 22nd, 1915.
- 1935 Henry Hamer (Hall Biplane, Hall School, Hendon). Oct. 22nd, 1915.
- 1936 Flight Sub-Lieut. Edward Laston Pulling, R.N.A.S. (Maurice Farman Biplane, Central Flying School, Upavon). Oct. 22nd, 1915.
- 1937 Lieut. George William Thomas Garrood (13th Royal Warwickshire Regt.) (Maurice Farman Biplane, Military School, Shoreham). Oct. 22nd, 1915.
- 1938 2nd Lieut. Brian Edmund Baker (15th Rifle Brigade) (Maurice Farman Biplane, Military School, Montrose). Oct. 25th, 1915.
- 1939 2nd Lieut. George Hall Gordon, R.F.A. (Maurice Farman Biplane, Military School, Birmingham). Oct. 26th, 1915.
- 1940 Clive Harold Halse (Maurice Farman Biplane, Military School, Birmingham). Oct. 26th, 1915.
- 1941 Edric Henty (Maurice Farman Biplane, Military School, Brooklands). Oct. 27th, 1915.
- 1942 Frank Arthur Garlick (Maurice Farman Biplane, Military School, Brooklands). Oct. 27th, 1915.
- 1943 William Swanson Read Bloomfield (Maurice Farman Biplane, Military School, Brooklands). Oct. 27th, 1915.
- 1944 Capt. Ralph Harold Austin-Sparks, R.F.A. (Maurice Farman Biplane, Military School, Birmingham). Oct. 27th, 1915.
- 1945 Kenneth John Munro (Maurice Farman Biplane, Military School, Birmingham). Oct. 27th, 1915.
- 1946 2nd Lieut. Frank Fernihough, R.F.A. (T.) (Maurice Farman Biplane, Military School, Shoreham). Sept. 6th, 1915.
- 1947 Lieut. Charles Alfred Brooks (Wiltshire Regt.) (Maurice Farman Biplane, Military School, Ruislip). Sept. 11th, 1915.
- 1948 2nd Lieut. Geoffrey Ward Robarts, R.F.A. (S.R.) (Maurice Farman Biplane, Military School, Shoreham). Sept. 17th, 1915.
- 1949 Flight Sub-Lieut. Miles Jeffrey Game Day, R.N.A.S. (Caudron Biplane, Royal Naval Flying School, Eastchurch). Oct. 2nd, 1915.
- 1950 2nd Lieut. Whitworth Archibald Cecil Morgan (Welsh Regt.) (Maurice Farman Biplane, Military School, Farnborough). Oct. 7th, 1915.
- 1951 Capt. Alexander Morice Wilson (1/4th Gordon Highlanders) (Maurice Farman Biplane, Military School, Montrose). Oct. 17th, 1915.
- 1952 Lieut. Con William Eric Cole-Hamilton (2nd The Royal Scots) (Maurice Farman Biplane, Military School, Birmingham). Oct. 26th, 1915.
- 1953 Lieut. Herman W. von Poellnitz (Maurice Farman Biplane, Military School, Birmingham). Oct. 26th, 1915.
- 1954 Michael Amyas Julian Orde (Maurice Farman Biplane, British Flying School, Le Crotoy, France). Oct. 27th, 1915.

- 1955 Capt. Stanley Evelyn Lewis (Maurice Farman Biplane, Military School, Birmingham). Oct. 27th, 1915.
- 1956 Lieut. Kenneth Townley Dowding (Royal West Surrey Regt.) (Maurice Farman Biplane, Military School, Norwich). Oct. 27th, 1915.
- 1957 2nd Lieut. Cyril Talbot Burney Croft (Somerset Light Infantry) (Maurice Farman Biplane, Military School, Birmingham). Oct. 27th, 1915.
- 1958 Robert Alexander Little (L. and P. Biplane, London and Provincial School, Hendon). Oct. 27th, 1915.
- 1959 2nd Lieut. Alfred Oscar Gilby, R.F.A. (Maurice Farman Biplane, Military School, Birmingham). Oct. 28th, 1915.
- 1960 Richard Lionel Burdon-Sanderson (Maurice Farman Biplane, Military School, Brooklands). Oct. 29th, 1915.
- 1961 Arthur Noel Buchanan (Maurice Farman Biplane, Military School, Brooklands). Oct. 29th, 1915.

## AMERICAN CERTIFICATES.

- 346 George H. Simpson (Wright Biplane, Wright Aviation School, Dayton, Ohio). Oct. 2nd, 1915.
- 347 Gordon Fraser Ross (Wright Biplane, Wright Aviation School, Dayton, Ohio). Oct. 6th, 1915.
- 348 K. G. Macdonald (Wright Biplane, Wright Aviation School, Dayton, Ohio). Oct. 8th, 1915.
- 349 Percy B. Beasley (Wright Biplane, Wright Aviation School, Dayton, Ohio). Oct. 8th, 1915.
- 350 Stearne T. Edwards (Wright Biplane, Wright Aviation School, Dayton, Ohio). Oct. 11th, 1915.

## Extension of the Hours of Opening the Club.

The Club is now open from 9 a.m. to 10.30 p.m. each day, including Sunday.

## New Members.

Members are reminded that, according to the Rules, the Annual Subscription of any New Member they may propose, who is elected between November 1st and December 31st of this year, will cover the period up to December 31st, 1916.

## THE FLYING SERVICES FUND administered by THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The Fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 166, Piccadilly, London, W

Subscriptions.		£	s.	d.
Total subscriptions received to Oct. 27th, 1915...		9,936	6	0
Sir Charles Cheers Wakefield ...		63	2	0
Collected at the Westland Aircraft Works, Yeovil (Seventh contribution) ...			0	12 0

Total, November 3rd, 1915 ... 10,000 0 0  
166, Piccadilly, W. B. STEVENSON, Assistant Secretary.

## Reprisals for Air Raids.

IN the House of Commons Mr. Denniss asked the Prime Minister whether, in view of the defiance of international law by the German Emperor in ordering the wholesale destruction of the private property of civilians in this country by Zeppelins, the Government would take steps to trace and sequester the private

securities in England of the German Emperor and the rulers of the German states in order to hold them as security for the present and future damage caused by air raids.

Mr. Lloyd George replied: No, sir, my right. hon. friend does not consider that the suggestion offers a practical method of deterring the enemy from further violations of international law.



**London Aerodrome, Collindale Avenue, Hendon.**

**Grahame-White Civilian School.**—Straights with Instructor last week : Messrs. Franck, Gammon, Holman, Howe, Henshaw and McConnel. Eights and circuits with Instructor : Messrs. Fraser, Horridge and Hughes.

**Grahame-White School (R.N.A.S.)**—Straights with Instructor : Probationary Flight Sub-Lieuts. Moody and Ovens. Eights and circuits : Probationary Flight Sub-Lieuts. Gammon and Man. Eights and circuits with Instructor : Probationary Flight Sub-Lieuts. Aplin, Cross, Davenport, Graham and Sadler.

Instructors during the week : Messrs. Manton, Pashley, Russell and Winter.

**Beatty School.**—The following pupils were out during last week : Messrs. Baldwin, Begg, Bond, Bowick, Brown, Brynildsen, Byrne, Campbell, Collett, Collier, Cowper, Delves, Duffus, Fawcett, Fellowes, FitzHerbert, Fox, Gayner, Hodgson, Kirkwood, Lashmar, Litton, Mellings, Middleton, Nash, Nicholson, Podmore, Richard, Schollaert, Thompson, Halford-Thompson, Willmet, Samter, Hughes, and Barrow.

The instructors were Messrs. G. W. Beatty, W. Roche-Kelly, R. W. Kenworthy, G. Virgilio, A. E. Mitchell and L. L. King, the machines in use being Beatty-Wright dual-control and single-seater propeller biplanes and Caudron tractor biplanes.

Exhibition flights were given on Saturday by Messrs. Beatty, Roche-Kelly, Kenworthy and Virgilio.

**Hall School.**—In spite of bad weather last week, the Hall school put in an excellent week's practice. The following pupils qualified for their Royal Aero Club Certificates :—Messrs. Brandon, Bangs and E. Hall, all of whom took splendid tickets. The following pupils received instruction during the week :—With H. F. Stevens : Messrs. Brandon, Bangs and Hall. With C. M. Hill : Messrs. Broad, Nicolls, Butterworth, Drew, Stirling, Dodd, Dresser, Shum, Rattray, Manly, Sepulchre, Cook and Hall. With Charles Bell : Messrs. Wooley, Lieut. Bell, Redford, Mann, Smith, Ormerod, Cumberbirch, Arnsby, Capt. Grey, Milbourne, Cosgrave and Chapman.

One of our pupils whilst flying on the Hall *brévet* tractor had the misfortune to lose his way in the clouds, and had to make a forced landing several miles away from the Aerodrome. This he effected with complete success in a small field without the breakage of a single wire, much to the relief of H. F. Stevens, who flew the machine back to the Aerodrome.

Machines in use during the week : Hall (Government type) tractor biplanes.

**London and Provincial Aviation Co.**—Pupils doing rolling last week : Messrs. Porter, Heyn, Summerskill, Burgess, Atkinson, Jackson, Braim, Hunt, Lambert, Hardy, Roberts, Thorpe, Woods, Lees and Dawson. Doing straights : Messrs. Jowett, Lewis, Lockett, Knowles and Renton. Doing circuits : Messrs. Little, Franklin and W. Warren, jun.

Instructors : Messrs. W. T. Warren, M. G. Smiles and C. M. Jacques.

The Royal Aero Club Certificate was taken this week by Mr. R. A. Little.

**Ruffy-Baumann School.**—The weather would have been ideal for school work last week but for the repeated presence of fog, but even so this school has not been behindhand in giving its pupils plenty of practice.

The following students have all been busy on one or the other of the school machines : Messrs. Cole, Harkness, Vernon, De Grauw, Barnard, Coppens, Wood, Bailey, Cuthbertson, Bolton, Stewart, Liddell, Griffith, Launoit, Sherwood, Thomson, Laidlaw, Yiule, and MacBaine.

On October 29th Lieut. MacBaine took an excellent ticket, making a fine *vol plané* from 650 ft.

Instructors : Messrs. E. Baumann, Ruffy, A. Baumann and Winchester.

Machines in use : Three Ruffy-Baumann Caudron type biplanes of 60 and 50 h.p.



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Capt. I. F. Fairbairn-Crawford, R.E. (T.F.), who has just secured his Royal Aero Club pilot's certificate at the Ruffy-Baumann School, Hendon. Capt. Fairbairn-Crawford is in control of the aviation section of Messrs. Sir W. G. Armstrong, Whitworth and Co., Ltd., of Newcastle-on-Tyne.





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A QUARTETTE OF PUPILS WHO HAVE RECENTLY QUALIFIED FOR THEIR CERTIFICATES AT THE HALL SCHOOL, HENDON.—1. Mr. B. G. Watson. 2. Mr. P. E. Bayley. 3. Mr. H. Hamer. 4. Mr. A. De Bathe Brandon. Both Mr. Watson and Mr. Brandon are Australians, and joined the school within a week of one another. Mr. Watson was in the Sopwith Company, and is now at Brooklands testing their machines.

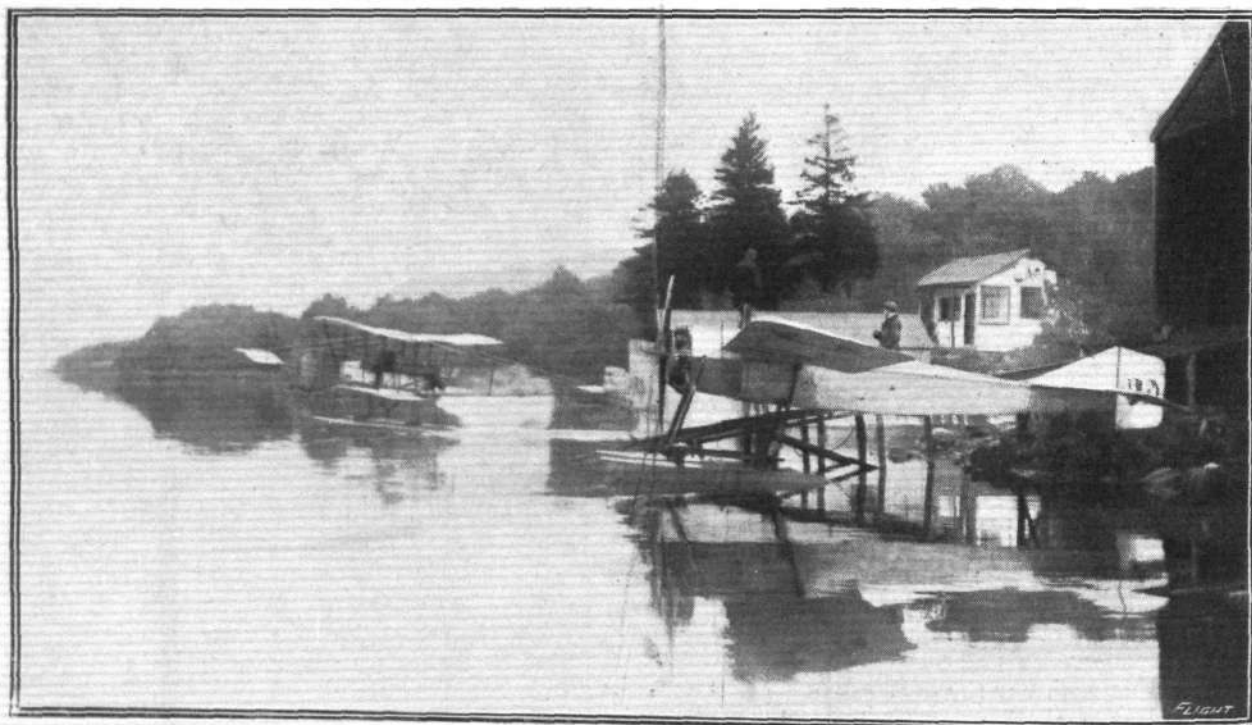
### Northern Aircraft Co., Ltd.

**The Seaplane School, Windermere.**—Work last week with instructor: Miss C. Rowland (30 mins.), Coats (10), Lieut. Stubbs (23), Ruthven (20), Lieut. Manning (19), Jeffries (13), Lindner (7), and Moore (52, extra practice). With instructor as passenger: Coats (14 mins.), Benson (17), Shaw (18), Inglis (16), Part (17), Lawton (14), and Barber (17). Solo: Robertson (10 mins.) and Macintyre (11).

Instructors: W. Rowland Ding, J. Lankester Parker,

and W. Laidler. Machines: N.A.C. Blackburn monoplane, 100 Anzani dual-control, and N.A.C. propeller biplane, 80 Gnome.

The 100 Anzani-Blackburn monoplane was out for the first time on Tuesday, Mr. Ding taking her up and handling her with his usual skill. She is a credit to Messrs. Blackburn, who are now one of the foremost constructors in the country. It speaks well for them that the machine, a new type, was able to carry on tuition without any alteration or adjustment.



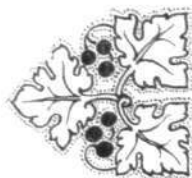
AT THE N.A.C. SCHOOL ON LAKE WINDERMERE.—Two of the machines in use for pupils. Left: The N.A.C. 80 h.p. Gnome biplane just "off"; and, in the foreground, the 100 h.p. Anzani-Blackburn monoplane.

### Names for British Airships.

SUGGESTIONS have been encouraged by one of our daily contemporaries, for a British name for British airships of the Zeppelin breed. Quite a number have been proposed, and we think that it would be an impossibility to beat, for utter imbecility and unsuitability, practically every name proposed so far. There is only one that has even the merit of being passingly reasonable, and that

emanates from Mr. C. Harrington Moore, who was one of the first men to be associated with motorism in its earlier days. Mr. Moore's suggestion is "Airlion," pronounced either as written or as "Airleon."

The appellation of "Aerial Dreadnoughts" as put forward by Nurse Vincent may come in time—but that time, under existing conditions, is hardly yet.



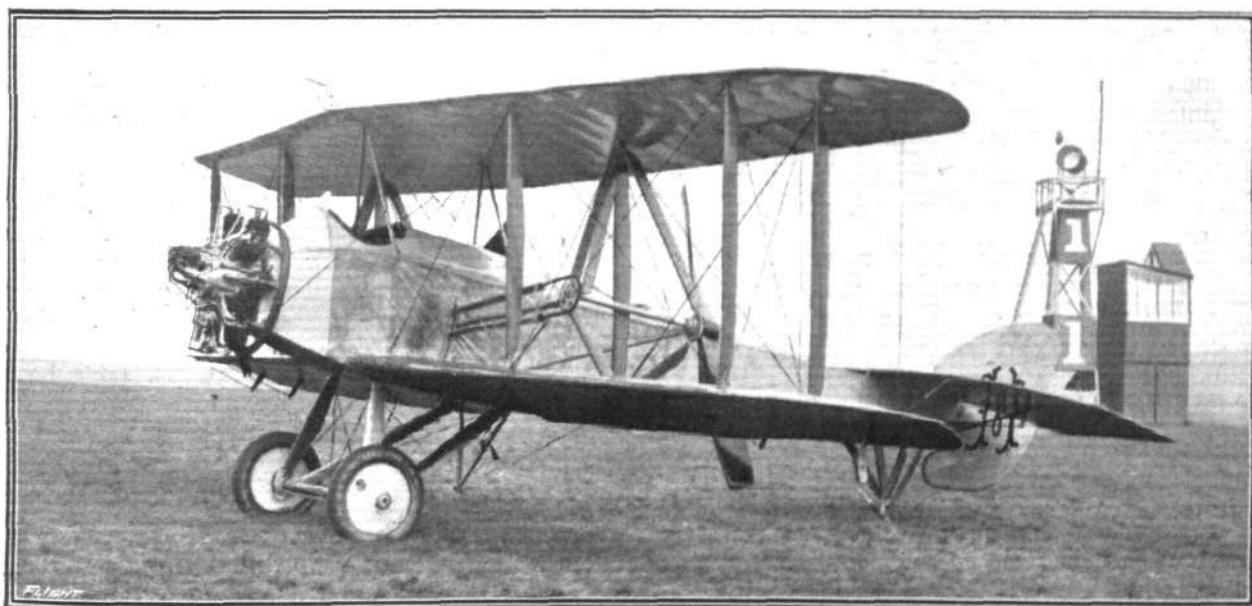
## FLYING AT HENDON



HENDON aerodrome on my arrival last Saturday afternoon presented a lively appearance. For once in a way, school work was in full swing at the commencement of "hostilities" instead of at the close of the proceedings as has generally been the case. This strange state of affairs was brought about owing to the fact that fog and bad weather generally had gently but firmly forbidden school work during the hours previous when such work should have been carried on. In other words, a spasm of fine weather afforded an opportunity for making up for lost time. Mingling with the rolls, hops, straights, half-circuits and circuits of the pupils were the usual exhibition and passenger flights of the various Hendon pilots, whilst one of the pupils—one of Beatty's, I think—flew for his R.Ae.C. *brevet* on a Caudron. The new 60 h.p. (Le Rhone) G.-W. school 'buses, as well as "old 110" (50 h.p. Gnome), were much in evidence piloted by Marcus D. Manton, M. Osipenko, C. Pashley and J. S. B. Winter. G. W. Beatty made a test flight on his latest 45 h.p. Caudron, climbing to 2,000 ft. at quite a decent speed. W. Roche-Kelly puzzled not a few of the visitors by repeatedly starting off with a passenger on the 50 h.p. Beatty-Wright, making about a quarter-circuit and then landing. "He can't get it up," said several visitors, but what was really happening was "instruction in landing"; however, *they* did not know that, so when he made an extended flight later on the said visitors appeared much relieved. G. Virgilio also took up the 45 h.p. Beatty-Caudron, and added a little excitement to the proceedings by suddenly disappearing behind the railway embankment. He returned, minus the 'bus, some little time later, and reported that the engine gave

up its ghost, and one or two other rather important components, and so forced him to land rather suddenly, fortunately without serious results. A similar occurrence, it will be remembered, happened to J. H. Moore with his 'bus some little time back. C. M. Jacques joined the merry throng on the 45 h.p. L. and P. "blue" Caudron.

At 3.45, A. E. Barrs started off with a passenger on the 125 h.p. Mann biplane, and climbed steadily until he reached an altitude of nearly 7,000 ft., at which height he found it so cold that he decided to descend, which he did, with a number of fine right and left hand spirals. He was up for just over the hour. Barrs and his passenger both had an excellent view of London; the Thames could be traced as far as the mouth. The Mann 'bus has been out quite a lot just recently. On Wednesday of last week Barrs took up a passenger for 15 minutes and attained a speed of well over 80 m.p.h. The next day he made another passenger flight, and was caught in a thunderstorm, which, I am told, failed to make the 'bus turn a hair. On the Friday, Barrs put the machine through its preliminary R.N.A.S. trials, when he was up for 25 minutes, but, as is usually the case on occasions such as these, the engine failed to give its full number of revs., so the results were not of the best. However, the fine flight on Saturday more or less made up for it. Other machines out during the afternoon (Saturday) were a B.E.2c, two Maurice Farman "short-horns," one of which, I believe, was piloted by W. Birchenough, and a Burgess "pusher," fitted with a Sturtevant motor. If there were other pilots busy, I crave their forgiveness for not having noticed them.



The 125 h.p. (Anzani) Mann twin-pusher biplane in its latest form.

Photo. by F. N. Birkett.





By THE

"DREAMER."

*"Who aimeth at the skie shoots higher much than he that meaneth a tree."—Herbert.*

THERE are some things about which there can be no two opinions; evidently flying is *not* of that class.

Whether the ability to fly an aeroplane be an art or a science is a point on which opinion seems to be greatly divided. Starting with the knowledge that science teaches us to know, and art to do, flying is yet one of those things in which it appears to be difficult to determine just where the one ends and the other begins, or whether, as some assert, that the two are so intimately mixed in the act of flying as to be concurrent in operation.

If I appear to lean a little to the side of art, I do so with the full knowledge that I am going in direct opposition to the majority, for all the pilots I have spoken to personally on the subject have given it as their opinion that it is a science, and they certainly ought to know better than I, who have never piloted a machine. But did I side with them, did I in fact allow myself to be guided into their way of thinking, we might all of us slip into the wrong channel simply from want of opposition. In addition, I would like to see this question discussed in the correspondence columns of "FLIGHT."

I argue that science terminates directly the machine is in the air. A machine is wheeled out into the aerodrome, the pilot takes his seat, the engine is started, and the machine commences to run along the ground. Perhaps, with the exception of ruddering a little to keep a straight course, owing to the liability of the machine to run askew should the ground be a little rough, the pilot need do nothing. If he keeps the "joy-stick" at neutral, the machine, being properly designed, will rise into the air directly it has attained its flying speed. Thus far it is science. The machine flies simply because it has been scientifically designed with the object of flying. Beyond this, I maintain it is the art of the pilot that governs all until the machine is safely on the ground once more.

Given a suitable day and a well-designed machine, I know it will continue on its course without the pilot's assistance, and also, that with most machines it is possible to fly for quite a long time with the hands off the controls, and I will grant that this is due to science, but it is only after all a question of time. Almost always no sooner is a machine in the air than the art of the pilot is called into requisition to correct a fault, not in the science, but in the vagaries brought about by the fickleness of nature.

One of the arguments put forth by those who maintain that flying is science pure and simple—and I have heard it from those who have flown thousands of miles—is, that once in the air, there is so little to do, that on long journeys, with everything going all right, it is a job to find something to occupy one's mind and so prevent a kind of sleepy stupor, partly induced by the roar of the engine. I must admit, from the amount of evidence, that this is so. But there again, I argue that it is but the temporary overlapping of science owing to the fact that

the machine is on a straight course, which brings me back to where I admitted science before. Again, there are the words "with everything going all right" art must be for ever on the alert to take charge. A sudden bump, up or down, a side gust, and the machine needs the guiding hand of the pilot to hold her on or to place her back on her proper course. Left alone, she would possibly right herself again, but she would simply take up her course in the direction in which the disturbance happened to turn her, or in the event of a very severe bump, might get nose down, when, if left to science, she would simply do what science intended she should do, continue to fly straight, be it horizontally or vertically downwards. "Anybody can learn to fly" is the strong point of those arguing for science. I admit they can, but it does not prove to my mind that therefore art does not enter into it. Anybody can learn to draw, but it does not prove against the artist.

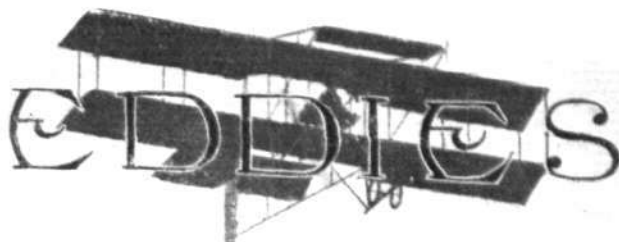
I do not wish to use it as an argument against the scientific side, that because a machine will not do everything of its own accord, and without the aid of man, that it is therefore not scientific, neither will I admit that because a machine is scientific the best can be got out of it without the aid of art.

May I instance the automatic piano-player? Here we have an instrument which the veriest novice can play. One has but to place the roll in position and pump the wind, and a tune will result, giving all the notes, the periods, the harmonics—everything. Thus far it is mechanical and scientific. But let a musician, an artist in his profession, but take control, and you shall admit that although the machine is scientific it requires art to play it.

I will not admit that our master pilots, our artists of the air, are but those with a little more scientific knowledge than their fellows. That they have learned the scientific part more thoroughly than their lesser skilled brethren is probably true, but they have soared far and away above the code of rules and regulations; they fly by intuition, by feeling, by art—they are artists.

I have in my mind two men, two pilots, whose names are my secret. They have both been flying for about the same length of time. One is, to my mind, an artist of the air, the other is a good, sound pilot. So far as safety is concerned, I would almost as soon trust myself with one as the other. But watch their individual flying. The one is aggressive. He always seems to have to start off from the bumpiest portion of the aerodrome. His machine is not so steady in the air. He lands with a slight hesitation at times, but always well and truly. Watch the other. His machine seems to be alive, to be part of himself. He rises smoothly, flies steadily. His turns and curves are artistically proportioned, and of almost geometrical exactness. He lands true and straight, and light as a bird. I argue that that man is an artist in his profession—that he flies by art—that flying is an art.





FOLLOWING on my little paragraph in "Eddies" last week regarding the taking prisoner, by the Germans, of Capt. Norman Spratt, R.F.C., it is, indeed, a pleasure to be able to record a few details of the circumstances under which Capt. Spratt lost his liberty. A very interested correspondent, whose identity I may not disclose but whose reliability is absolutely unquestionable, sends me the following cheerful message: "Seeing the paragraph in 'Eddies' in reference to Capt. Norman Spratt, R.F.C., I am pleased to tell you that he is a prisoner of war and unharmed."

"On the return journey of a long reconnaissance flight over the German lines on September 28th on an R.E.5, having a fearful wind against him, he was only able to do 30 miles in two hours. After four and a half hours in the air he was forced to descend in a ploughed field near Ghent, owing to engine trouble. He quickly fixed up the engine, and having only 15 minutes' petrol left was about to make for 'somewhere' when the Germans came up and captured him. He is now at Crefeld, where several R.F.C. officers are imprisoned."

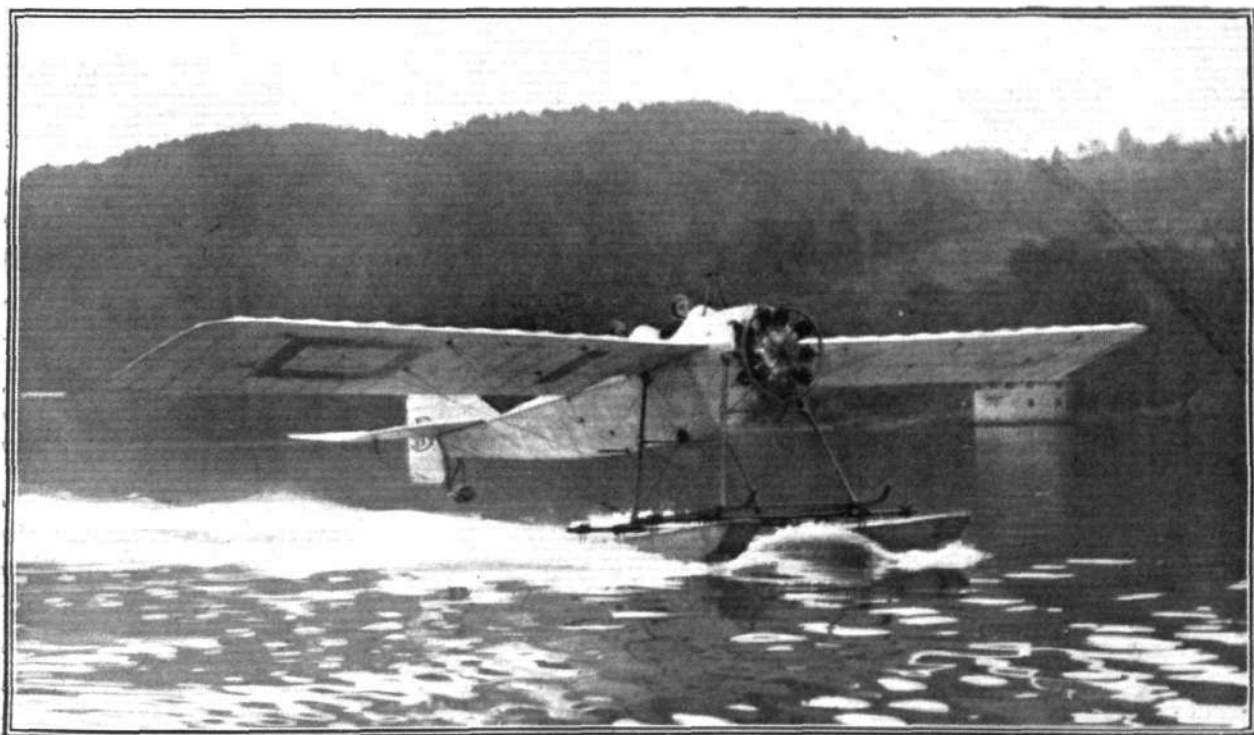
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It is comforting to know that although Capt. Spratt is a prisoner of war he is neither wounded nor injured. My correspondent does not state whether Capt. Spratt succeeded in setting fire to his machine before he was captured, but even if he did not, the Germans would not learn a great deal from the R.E.5, which is, perhaps, that

of our military aeroplanes which most resembles the average German 'bus. From the engine, at any rate, the enemy would not learn anything new, since the R.E.s are, I believe, fitted with Austro-Daimler engines of British make. It was, if my memory serves me rightly, on a similar machine that Capt. Spratt reached an altitude of nearly 19,000 ft. down at Farnborough somewhere in April or May of 1914. Little did he then suspect that some day a similar machine would land him in a German *Kriegsgefängniss*. I wonder whether the ancestry of the engine had anything to do with its "letting down" Spratt at such close proximity to the German lines.

x x x

One of the latest additions to the fleet of the N.A.C. on Lake Windermere is a Blackburn monoplane with a 100 h.p. Anzani engine. In its general arrangement this machine is, as will be seen from the accompanying photograph, similar to the monoplane exhibited at the last Olympia Aero Show. The nose of the body is somewhat different, however, owing to the fitting of an Anzani engine instead of the Gnome used on the Show 'bus. The change from a land machine to a waterplane has been effected without any great alterations, the wheels and their axles being removed and two cross members substituted, from which the two floats are sprung by rubber bands. This machine arrived the other day, and was immediately erected. As soon as this was accomplished, Mr. Ding took it out for a trial run, and found it



"OFF FOR A SPIN."—The 100 h.p. Anzani-engined Blackburn monoplane of the Northern Aircraft Co. starting on a trip over Lake Windermere, with Mr. Rowland Ding at the helm and Lieut. Stubbs in the passenger's seat.

in perfect trim, needing no adjustments whatever. Another proof of Blackburn efficiency and thoroughness.

x x x

If some of our professional aeroplane designers don't pull themselves together, according to some of the amateurs who are now undertaking to direct matters aeronautical, they should be looking for a job before long, having hopelessly failed to produce the Zeppelin straffer that is to successfully patrol the London area and "Eastern Counties" during the hours between sunrise and sunset. And it is such an easy task too; an amateur with the smallest smattering of aerodynamics and engineering practice could do it. At least one designer in this category, hailing from Copthall Avenue, feels confident of his abilities in this direction and has expressed his views in a communication to some of the daily papers. Thus writes this authority: "The reply to the Zeppelin is the aeroplane, but not the small machine. It is not, surely, beyond the skill of our aeronautical experts to design a machine which shall remain in the air at least from dusk to dawn and patrol the upper air ready to administer proper and effective resistance to the Zeppelins. Even my small knowledge of aerodynamics and engineering practice bids me believe that there is no impossible task in the construction of a fleet of a hundred aeroplanes having a flight capacity of twelve hours or even more,

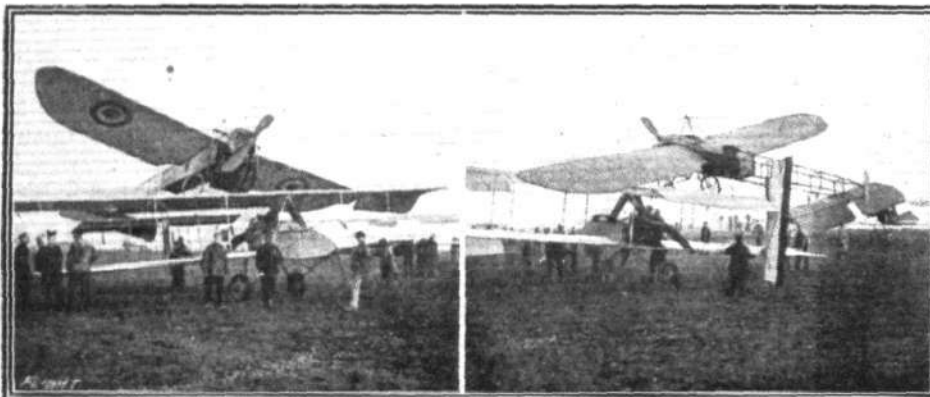
the hand lever and the foot bar and also how high the seat should be placed in order to bring the pilot's eyes just above the top covering of the *fuselage*. The device consisted of a flat celluloid figure with movable arms and legs, made to the same scale as the general arrangement drawings of the machine. By placing the figure on top of the drawing the approximate position of seat and controls are easily found.

x x x

As probably the majority of designers are much better acquainted with the proportion of tail planes to main planes for a given length of *fuselage* than they are with the proportions of the human body, I have persuaded a friend of mine, who has enjoyed an art training, to give me a few dimensions. For purposes of drawing, the human figure is divided into so many heads, the figure being generally drawn eight heads high. Dividing it up in this manner the first divisional line runs through the chin, the second through the breasts, the third slightly below the waist, the fourth on a level with the hips, and the sixth just below the knee-caps. The arms are generally taken as being three heads long.

x x x

In spite of the busy-ness of Hendon and the many more or less "near things" that occur almost daily up there, there is no case on record of a machine landing



A Unique Atterrissage.—A Blériot come to rest on the upper wing of a Voisin biplane. The occupants of both machines were none the worse for this little incident.

armed with guns and possessing a speed greater than any Zeppelin.

"Anyway if Mr. Lloyd George will give me the engines I need—and he can—as well as one controlled factory at my choice I will build 50 such machines in two months from now, and we should then have no more to fear from the German gas-bags." There you are! Now you know how to go about it. If you are short of engines go to Mr. Lloyd George and he can—if he will—give you the engines you need. If Mr. Lloyd George has had these splendid engines guaranteed, one imagines, to always run for twelve hours or even more, up his sleeve for some time, it would appear to be highly unpatriotic of him to have kept them in hiding all this time. It should not be forgotten, however, that there are other forms of gas-bags besides German.

x x x

Talking about designers reminds me that I was having a chat with one the other day and the subject cropped up of how to determine the amount of room that it is necessary to allow in a machine in order to ensure free movement, &c. In this connection I was shown a clever little "dodge" which enabled, with a minimum of trouble and quite accurately enough for all practical purposes, to be determined at what distance from the seat to place

on top of another without, practically, any damage being done to either. The incident illustrated in our photographs occurred at a French aerodrome some little time ago. The machines were both landing, and the Voisin, piloted by an N.C.O. and having a pupil as passenger, was gliding along about six feet from the ground. The Blériot was also coming down, and the *fuselage* and wings of the monoplane prevented the pilot from seeing the Voisin. At the instant when the biplane touched the ground the wheels of the Blériot alighted on its upper plane, and so gentle was the impact that the pilot of the Voisin did not immediately realise that anything unusual had happened. All the repairs that were necessary when the machines had been parted were a new wheel for the Blériot and a couple of ribs for the top plane of the Voisin.

x x x

The report which had gained currency, of the capture by the Germans of a giant Russian aeroplane, which was alleged to have served as a model for some of the new German "battle-planes," has been contradicted by Prince Boris Galitzine. None of these machines, the Prince states, have fallen into German hands. Prince Boris is President of the Russo-Baltic Company that has been building large machines for the Russian Government.

"ÆOLUS."

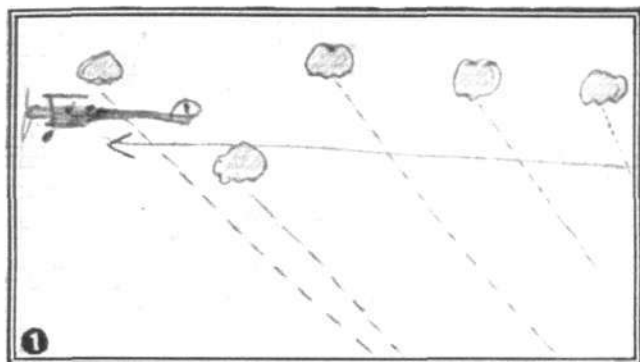
# BRINGING DOWN AN AEROPLANE.

[THE following vivid account from the trenches of the shooting down of an aeroplane was sent by the young officer who wrote it to his mother, and it is by her permission it is printed. We are indebted to the courtesy of the Editor of *Country Life* for its reproduction.—ED.]

"Yesterday, another man and I went to the trenches, and spent an interesting, though rather exciting, four hours down there. It was rather a 'lively' afternoon—continuous machine-gun fire, a lot of rifle fire, and intermittent gunning.

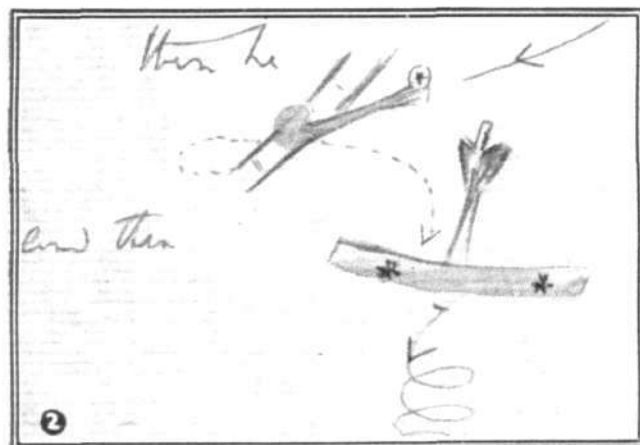
"When you see in the papers, 'A hostile aeroplane was brought down by our anti-aircraft guns,' I wonder what you think it is like? Well, I will try and explain. I saw one shot down in front of me from 8,000 ft. yesterday afternoon.

"It was one of the most fascinating and nauseating spectacles I



have ever seen. It was with extraordinarily mixed feelings I saw the poor wretches literally hurtle to destruction—at least one, as the pilot was obviously killed already. Just as we came out of the communication trench into the fire trench (front line) we saw a Hun going along just his side of the lines, parallel to them. Then our 'Archie' got on to him—got his line and elevation at once—but too far behind. Then each successive shot got nearer, and we kept saying: 'Gad, I bet that made him sit up!' Then, 'That got him! No, it didn't!'

"Then one burst exactly over him, just half-way along the machine. We never said a word—hoped and prayed it had him fair and square. Then the machine put its nose down a bit, did a half-turn and a sort of lurch—a drunken lurch; then put its nose right down vertically, and began to spin round faster and faster. It did not get very fast, however, but, having got up a certain



momentum, simply spun round and round and round vertically round its own axis.

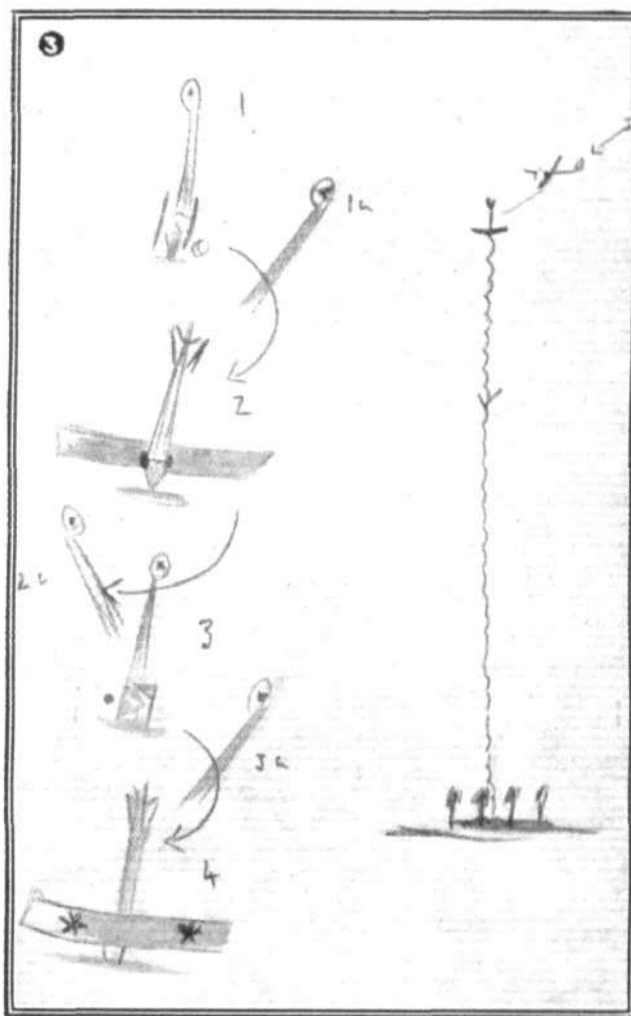
"About 5,000 ft. something came away—possibly a wing tip, or one of the passengers. It was simply appalling. It took such ages to fall; like a wounded bird at first, then—well, it was simply too fascinating, yet utterly repulsive. We hoped and prayed he would 'flatten out'—the technical term for pulling its nose up out of the 'spinning nose dive' it was doing. But it simply went down and down, turning all the time, its black crosses plainly visible to the naked eye every time the top-side of the wings came round, the engine roaring all the time, simply pulling the thing down, a sure sign the pilot was killed or insensible—as, if the controls had been severed (accounting for a spin), one would instinctively shut off the engine, which was not done.

"Well, it was a thing to see, but I do not want to see it again. It was the most wonderful, marvellous shooting one will ever see—only about twelve rounds, and then all over. No'ing in this world could possibly save them. Each shot is a *successive* one, i.e., the machine has moved on as each shell bursts. You can see the one that got him.

"Then he (see Sketch 2), and then (see Sketch 3), &c. From 8,000 ft. he fell just inside their own lines—about 100 yards behind—unfortunately. We just saw a bit of white behind a hedge and some trees through a periscope.

"They waited for the Huns to begin to collect round, and then a battery of field guns put about 50 rounds slap into it in about a couple of minutes. Bang—whizz-z-z—plonk! Bang—whizz-z-z—plonk! The shells just clearing our heads as they came over our own parapet—from our rear, of course. The trenches were only a couple of hundred yards away from each other.

"Our men sent up a terrific cheer as he fell. We had not the heart to, knowing what it all meant.



"After that we wandered about—to Neuve Chapelle, right over the village, about a hundred or two hundred yards behind the lines. You had to look pretty slippy for snipers: Pffsssss—tweepppp—follop (hit a tree). Pffssss—kkfss (a 'ricco')—each awakening a hollow echo among the ruins. The château, the church, and the brewery just the same, a pile of old bricks.

"The graveyard adjoining the church had the roof of one of its graves blown clean off, and the lid of the coffin, too, disclosing the remains of what was once apparently a woman—yellow and contracted like the opened mummies in the British Museum—in its torn winding sheet.

"But perhaps the most pathetic sights are the improvised graveyards where the dead soldiers and officers are buried—a rough wooden cross with name, date, and regiment neatly put on, and, perhaps, pencilled in afterwards, 'R.I.P.' Particularly pathetic, and only too common where the fighting has been thick."

"AEROPLANE."

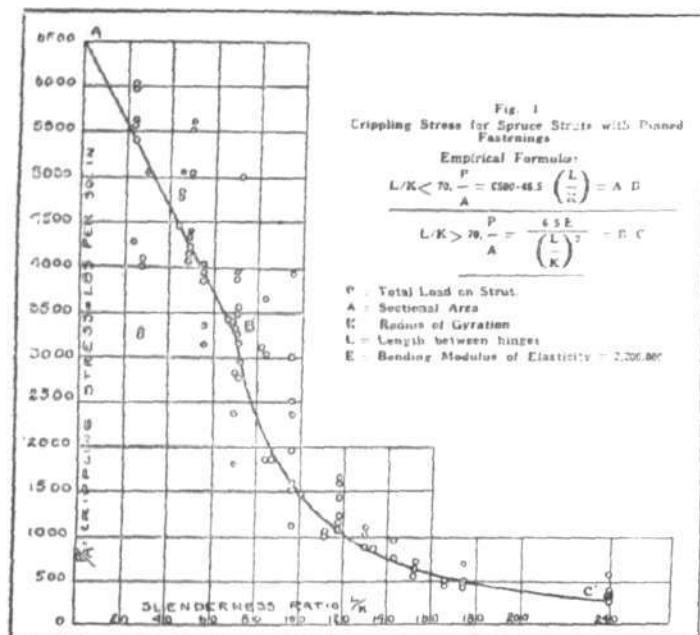


## SPRUCE AEROPLANE STRUTS UNDER COMPRESSION.

By J. C. HUNSAKER, U.S. NAVY, Instructor in Aeronautical Engineering, Massachusetts Institute of Technology.

DURING the past year Messrs. J. L. T. Santos and Wai Po Loo\* undertook an investigation of the performance of spruce struts under compression. Their experimental results are here presented in summary for the benefit of aeroplane designers, together with some notes which may be of interest.

**Wood Employed.**—Maine white spruce, cut in the winter of 1913-14, sawed into 2 in. plank in the spring of 1914 and stored in a well ventilated lumber shed until April, 1915. Selected planks free from knots, shakes, and other defects were sawed and planed into straight grained sticks varying in length from one to six feet.



These sticks were untapered, some of section  $1\frac{1}{2}$  by  $\frac{3}{4}$  ins., and some of section  $1\frac{1}{2}$  by  $\frac{1}{2}$  ins.

**Fastening.**—Each stick was fitted with pinned sockets. The rectangular sticks were tested with the pin axis parallel to the short side, and to the long side.

**Testing.**—Each stick was loaded in compression in a testing machine until it buckled and refused to take more load. This

deflection under central loading. E was found to have an average of about 1,825,000 lbs. per square inch. This value is taken rather than the modulus for compression because long struts fail by bending rather than by compression, and also because the bending modulus can be more precisely determined.

**Crippling Stress.**—The crippling load in pounds divided by the area of cross section in square inches, is defined as the crippling stress. Values of crippling stress for all sticks tested are plotted in Fig. 1 on the ratio  $\frac{L}{K}$  as abscissæ, where L is the length of the

stick and K the radius of gyration defined as  $\sqrt{\frac{I}{A}}$ . I is moment

of inertia of section about an axis parallel to the axes of the pins in ends, and A the cross section. The curve drawn is an average curve expressing the mean results for sticks of all lengths, areas and fastening. It was found of slight importance whether the socket pins were parallel to the short or long side of the section. In Fig. 1, each point represents the crippling of an average stick of spruce of the best quality.

**Euler's Formula.**—For long struts (with a ratio  $L/K$  greater than 70) it has been customary to employ Euler's formula to compute the crippling stress.

$$\frac{P}{A} = \frac{n^2 E}{\left( \frac{L}{K} \right)^2}, \text{ where } n^2 = 9.87 \text{ for pinned ends.}$$

The experiments here reviewed indicate that for this grade of spruce the constant of Euler's formula should be about 8.72 in order to express an average result. Hence, in aeroplane design where

$L/K$  is greater than 70, we may take  $\frac{P}{A} = \frac{8.72 E}{\left( \frac{L}{K} \right)^2}$

**Straight Line Formula.**—For short struts (ratio  $L/K$  less than 70) a so-called straight line formula is in general use. For this grade of spruce, we may use as an approximate formula expressing the average result of these tests:  $\frac{P}{A} = 6500 - 46.5 \frac{L}{K}$

**Factor of Safety.**—In all engineering structures a factor of safety is allowed for unusual conditions of loading not contemplated in the design. This factor is often between 4 to 8 in aeroplane wing construction. In addition to the above, we should allow a factor of safety for material. For spruce struts, it appears from these tests that there may be a variation in strength of as much as 50 per cent. below or above the average strength of a number of similar

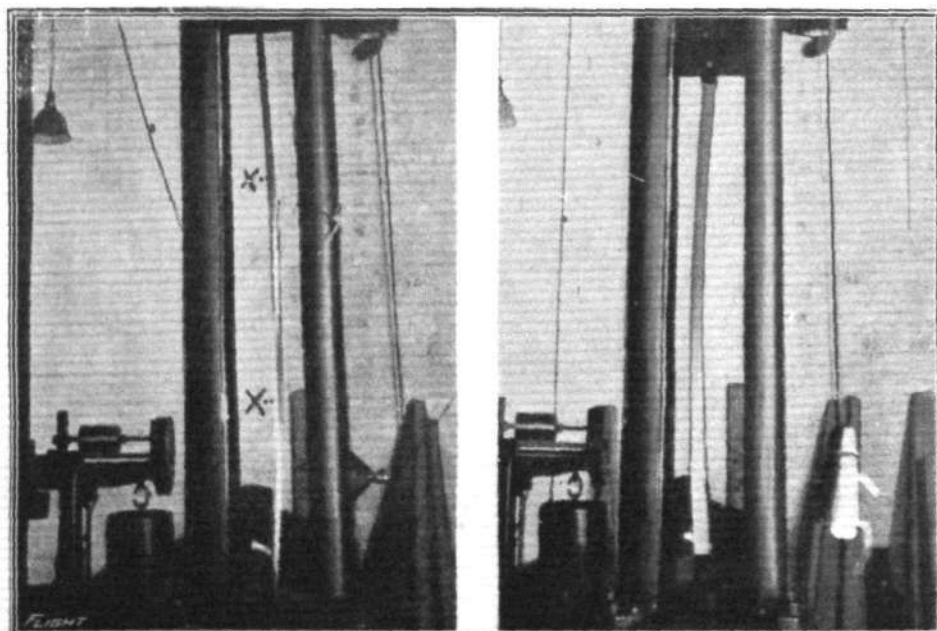


Fig. 2 (on left).—Buckling of tapered strut (note sharp bend at XX). Fig. 3 (on right).—Buckling of uniform strut.

maximum load was taken to be the "crippling load." No sticks were broken, as all failed by buckling.

**Modulus of Elasticity.**—The modulus of elasticity, E, of the wood was computed by bending a beam and observing the rate of

\* Thesis for Bachelor of Science Degree, Mass. Institute of Technology.

specimens, loaded in a similar manner. This irregularity in crippling load is possibly due to very slight initial curvature in the struts, to a slightly unsymmetrical loading not readily detected, and to variations in elasticity between sticks cut from different parts of the same log. In view of the uncertain nature of the strut fastening

in most biplanes, and especially in view of the possibility of an initial curvature due to stretching or breaking of wire bracing under load, bending of wing spars and general elastic yielding of the wing girder, it is recommended that a factor of safety 2 be allowed for biplane struts in addition to the load factor 4 to 8. This would then bring the gross factor of safety between 8 and 16.

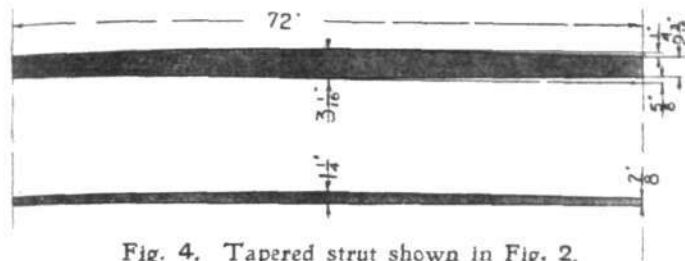


Fig. 4. Tapered strut shown in Fig. 2.

**Tapering.**—In connection with the general investigation of struts, the effect of tapering struts as usually employed was found to diminish the strength unless very carefully done. In a particular case of an excellent looking tapered biplane strut submitted by a manufacturer, the strength was found to be considerably less than that of an untapered strut of similar length, section and material. The tapered strut was only one-half pound lighter than the other.

The photograph of Fig. 2 illustrates failure by buckling of a tapered strut. Note that the central portion remains straight, while the ends bend in sharply. An untapered strut is shown buckled in Fig. 3. The curvature is circular. Tapering a strut appears to save very little weight and to be dangerous practice. Tapering is therefore not recommended beyond cutting down six or eight inches near the ends to fit into the sockets. The effect of taper will be considered further, and at the present time no conclusions can be drawn as to the proper method of tapering. The type shown in Fig. 4 was found to have a strength equal to that of an untapered strut of the same maximum cross section.

**Fastening.**—To avoid initial curvature, pin or hinge sockets are recommended, with the axis of the pin parallel to the long axis of the strut section. Warped or bent struts should be instantly replaced by true ones.

**Material.**—Further tests, which it is not possible to give here, indicate that Maine and West Virginia white spruce and Oregon red spruce are approximately of equal strength when used as struts. Three white spruce struts averaged about 10 per cent. stronger than three of red spruce, but no conclusion should be drawn from so few specimens.

**Lamination.**—The effect of making up a strut of six glued laminations was observed not to alter the crippling load for a given design of strut, although the laminated strut could be buckled to a greater degree without permanent injury. The crippling load of a long strut appears to depend on the modulus of elasticity only. The latter can be little if any affected by thin films of glue.



## ZEP. AND OTHER ANTIDOTES FOR HUNS FROM VARIOUS SOURCES.

AN authoritative statement should be made that we shall make it an indispensable condition of peace that representatives of the persons responsible for the Zeppelin raids should be delivered up to our Government for public execution. If every person responsible for a Zeppelin raid knew that he was personally liable to be hanged by the British Government on the conclusion of peace, it might, perhaps, give him pause.

The Deanery, Canterbury.

H. WACE.

LET our Government state boldly, and mean it, that after the next raid all Hun property within the Empire shall be confiscated, and there will be no more of these "methods of frightfulness." The decencies of civilisation are but signs of degeneracy to the unspeakable Boche. Why, then, waste further breath in protest?

Devonshire Club.

LONDON PRIDE.

THE British Empire holds one hundred million pounds worth of German capital.

I suggest that one million should be sequestered for the brutal murder of Miss Cavell and paid into our Red Cross Fund.

Similar moneys may be paid to the same fund if within four weeks our prisoners in Germany are not treated as well as we treat German prisoners.

G. MANERA, Lt.-Colonel, I.A. (retired).

Palmeira Towers Hotel, Westcliff-on-Sea.

AT once commandeer all German money, land, and property in the Empire. Germany has already done this; we can suffer nothing more, and we shall never get a penny of what they owe us.

The same should apply to Zeppelin raids, submarines, everything. Glasgow.

PETER J. MACKIE.

Probably an enemy would think twice about persisting in raids which had no military value, if he found that they recoiled upon himself and upset the confidence of his own civil population. But if reprisals are to be effective they must be thorough. Nothing is more futile or more cruel than half-hearted severity. Those who let themselves be paralysed by scruples are fortunate when in a crisis a statesman arises who, sure of his principles, ignores their criticism, throws scruples to the winds, and saves them in spite of themselves. They may comfort themselves by reflecting that if anyone is to be damned it will be he; and he will take the risk.

Avonmore, Roehampton, S.W.

T. RICE HOLMES.

AIRSHIPS of the right sort could rise when warned of the approach of the Zeppelins and wait aloft to attack them when they came. Under these circumstances not many bombs would be dropped on London or any other place. I know it will be answered that we have no armed aircraft of the sort, but the Zeppelin season is going over, and surely these could be constructed before another comes next year, bringing with it more frequent and heavier attacks and longer lists of victims.

H. RIDER HAGGARD.

IF Zeppelin raids are less effective in the future, it will be due, not to our reprisals, but to greater efficiency in our measures for protection. . . . We now regard crimes less as wrongs to the individual sufferer than as affronts to human society, and we surrender our private vengeance to the law. But it is only the assurance that justice will be done which saves us from lynch law and the methods of barbarism. . . . We entered the war to vindicate public international law; we must prosecute it until we can hold a grand inquest of humanity and present the criminals to justice.

But it is no punishment for the criminals—namely, those who have ordered, organised, and effected these crimes—if we kill the kin of other people.

A. F. POLLARD.

University of London, University College, Gower Street, W.C.

THE German Government are not going to shed any tears over the deaths of German women and children. I suggest, however, that the German property in the hands of the Public Trustee should be used to compensate British civilians for damage done by Zeppelin raids, not only to property, but also to the dependents of those who are killed. German financiers will then soon cease to bolster up war loans. Any retaliatory confiscation of British property by the German Government can be dealt with at the end of the war. Meanwhile the German can only be touched through his pocket.

The Athenæum, Pall Mall, S.W.

E. S. P. HAYNES.

I HAVE noticed that when the Zeppelins have been over London it has been found impossible to get the correct range, and I think this is due to the fact that the gunners are not able to distinguish among the bursting shells which one they fired.

If different batteries fired shells which flashed different colours on bursting it would be easy for other batteries to signal to them if their shells were falling short, or too high, or too low, as the case might be, and so give them the range. Any pyrotechnist would supply the necessary chemical mixture.

88-90, Chancery Lane, W.C.

P. BRIDGMAN.

A ZEPPELIN can stop its engines and poise noiselessly above the earth, picking up signals by light or sound. . . . While it is obvious that a Zeppelin going at full speed makes a noise like a dozen traction engines, it is equally evident that Sir John Simon was well informed when he discouraged the idea of a noisy tocsin from the church bells of London.

SPECIAL CONSTABLE.

A FEW minutes before the last of the air raids in the London district I was standing at my door and heard distinctly clocks for a long distance round chime the time. To any skilled balloonist this would denote that he was over a big town or city. We have the fog-time coming on. Fog carries sound, as anyone who has lived by the sea or a big river well knows. Why should not the Home Office forbid the chiming of clocks?

G. E. B.



# THE "ARRIVAL" OF THE AEROPLANE.\*

By ALGERNON E. BERRIMAN, M.I.A.E., A.F.A.E.S., Chief Engineer of the Daimler Co., Coventry, England.

## Introduction.

IN the title of my paper I use the word "arrival" in the sense in which one says of a man and his career, "He has arrived."

The aeroplane has "arrived" in the present war, which has provided just the setting that was needed to convince the public of its real worth. Previously, aeroplanes were to the public just wonderful inventions, something to be quizzed, like caged animals that are familiar enough—at the Zoo.

To-day, this same class of machine has become one of our national institutions—an accepted, respected fact destined to pass muster henceforth among the commonplace wonders in the service of man.

For the moment it is employed as an engine of destruction, but ultimately we may hope for a final rôle wherein it may minister more truly to his welfare.

Since the beginning of the war, the aeroplane has played such an important part as to have become an outstanding feature of the conflict. The presence of this new "Fourth Arm," as it has been called, has unquestionably revolutionised some of the more important conditions of warfare, although it has not yet revolutionised the mode of warfare itself. Cavalry, infantry, and artillery continue their appointed work, and although the reconnaissance work of aircraft is, perhaps, more closely related to the duties of cavalry than to either of the other arms, such an additional useful function as the direction of artillery fire will alone serve to place aircraft in an entirely new category.

Although the war is directly responsible for the present widespread recognition of the aeroplane's part as a military arm, and as a reliable vehicle, the foundations of the successful behaviour that have roused this general esteem have been the work of a long period of most painstaking labour. The science of its design, and the art of its use, have not been born in this hour of necessity.

When I say that the British Government, at the outbreak of the war, was in a position to invite tenders from engineering firms generally for the construction of aeroplanes to Government designs, for which fully detailed drawings and specifications were in readiness, I consider that I am paying the highest possible tribute to the enthusiasm and dogged determination of those later-day pioneers who are really responsible for the "arrival" of the aeroplane in the present war.

More than this they could not accomplish, for the engineering of its construction in sufficient quantities to meet the country's real needs, as now demonstrated, is susceptible only of a financial solution, such as a national purse can alone provide. To-day those purse-strings are thoroughly loosened for the first time.

So recently as 1913 the Navy League organised a campaign for influencing public opinion in favour of an estimate of at least £1,000,000 sterling for aeronautics in the forthcoming National Budget. No withstanding all efforts—and the campaign received the unscheduled, but none the less welcome, stimulus of a scare caused by the reported visit of a strange airship to our shores—the public at large remained stolidly apathetic, and raised no murmur when Parliament at last voted only half the anticipated sum.

For them the aeroplane had not yet "arrived"—and this, as I say, was within almost a twelvemonth of the outbreak of the war.

For the two previous years, the figures for the national expenditure on aeronautics were only £308,000 and £131,000. I have no knowledge whatever as to the total national expenditure to date this year, nor can anyone foretell the amount that it will attain; but it is certain that several contractors are now working upon the execution of contracts, each of which represents a figure in the order of those just mentioned.

When, therefore, it is realised that the aggregate of the nation's expenditure has hardly represented more than a decent amount of business for one or two large firms, it is possible to appreciate the brave spirit in which those earlier workers maintained this diminutive aeronautical industry.

## Manufacture as Distinct from Design.

The fact that the British Government was in a position, at the outbreak of the war, to invite tenders for aeroplanes of official design, and that many non-aeronautical firms, notably among those in the automobile industry, contracted to build these machines, affords a good illustration of the line that can and, in my opinion, should be drawn between manufacture and design. This division of industry does not always commend itself to the inventive genius, and instances are not few in the field of engineering where good workers have confused their opportunities by lack of this perception.

Engineering, in the commercial sense, is fundamentally a financial problem, being primarily concerned with the uninterrupted employ-

ment of the invested capital represented by the buildings and machinery belonging to the firm. One design of article is better than another according to the degree to which its greater popularity commands a greater amount of profitable business. From a manufacturer's standpoint, it is a matter of indifference whether the design is an aeroplane or a motor car, so long as the existing organisation and machinery are capable of producing it.

In this connection, however, I may say at once that it is not advisable to try to build aeroplanes in a motor-car factory that is also fully engaged on its proper work, without planning for extensions both to buildings and machinery, as the very size of an aeroplane, to say nothing of the multiplicity of its details, precludes the possibility of its being sandwiched in as a mere "addition to schedule" in some already full works' programme. Moreover, the requirements, both in material and labour, are sufficiently uncommon to monopolise much of the time of the managing staff.

For the construction of aeroplane engines, however, the normal capacity of a well-equipped automobile factory should already be adequate, except in so far as the capacity of the machine shop will inevitably represent the narrow neck of the bottle when it becomes a question of a high rate of output. Also, it is important to recognise the fact that the building of aeroplane engines contributes no industry to several other departments that are necessary to the construction of a complete motor-car. These are, of course, purely economical considerations and do not affect the potential utility of a properly equipped motor car factory for the purpose of building aeronautical engines in emergency.

As an example, I might mention that the famous Gnome rotary motor, hitherto built only in France, was reproduced and running in England within eight weeks from the outbreak of the war. There were neither drawings nor specifications, but a sample engine was dismantled and measured, and the drawings were completed in one week. In the Gnome engine every part is finished all over, and the cost of the machining labour is therefore disproportionately high. Indeed, there is so much work for the heavy capstan type of lathe as to monopolise this section of the machine shop, and, therefore, to cause some general disorganisation, unless due precautions are taken.

The problems relating to the building of aeroplanes to existing designs are purely those common to manufacturing engineering generally, and the path to a successful issue is not necessarily affected by lack of expert knowledge of the problems underlying design. Provided the drawings are accurate and the specifications exact, the product ensues as a matter of course upon the setting in motion of any organisation that has the capacity to produce it. It should hardly be necessary to emphasise the need for system and care in handling outside designs of this character, particularly when they are subject to frequent alteration, but such precautions appertain to the province of general business ability, and are needed in every walk of life.

From the little I have already said about the constructional side of aeronautical engineering, it should readily be apparent that the problem of supply can be trusted to find its own solution if the time ever comes for the aeroplane to take a permanent place among the accessories of civil life.

For the moment, it is purely an instrument of war, but its already phenomenal success in this field of operations ensures the permanence of its military importance and the continuity of its development in time of peace. None can foresee the outcome of this régime, but it seems to me impossible to believe otherwise than that aircraft will ultimately attain to a wider sphere of employment than is indicated by their purely military use.

## The Non-Military Aeroplane of War.

Notwithstanding the fact that the aeroplane of to-day is essentially military in its importance, it would be misleading to suppose that it is equally military in its design.†

† For a comprehensive discussion of the military requirements in aeroplane design, see the following papers read before the Aeronautical Society of Great Britain, and published in the "AERONAUTICAL JOURNAL" and "FLIGHT" as follows:

- "The Military Aeroplane," Col. J. E. Capper, "FLIGHT," December 16th, 1911.
- "The Military Aeroplane," Major Radcliffe, "FLIGHT," December 23rd, 1911.
- "Military Airships," Lieut. C. M. Waterlow, "FLIGHT," March 9th, 1912.
- "The Design of a Military Scouting Aeroplane," Brig.-Gen. D. Henderson, Vol. XVI, No. 63, July, 1912.
- "Aeroplanes in the Light of the Military Trials," A. E. Berriman, "FLIGHT," November 23rd, 1912.
- "Air Targets for Artillery and Rifle Practice," Brig.-Gen. F. G. Stone, Vol. XVII, No. 65, January, 1913.
- "Military Aviation," Major F. H. Sykes, "FLIGHT," March 8th, 1913.
- "The Coming Airship," Capt. C. M. Waterlow, "FLIGHT," December 6th, 1913.
- "Further Developments of Military Aviation," Lieut. Col. F. H. Sykes, "FLIGHT," February 14th, 1914.

\* A paper presented at a meeting of the International Engineering Congress, 1915, in San Francisco, Cal., September 20th-25th, 1915.



The most important defect of the majority of modern aircraft, when regarded as fighting machines, is the restriction of forward gun fire imposed by the presence of the tractor screw. For the effective use of a gun nothing has yet been built to equal the "pusher," but this type itself tends to be deficient in speed.

It is unreasonable to expect one type of aeroplane to fulfil all the requirements of war. Reconnaissance is the primary function of military aeronautics, but such aircraft need at least the protection of a fast scout, while their complete freedom of the air can only be established by an absolutely superior real fighting fleet. These three classes are fundamental: there remains to be fulfilled such special purposes as bomb-dropping and other incidental duties that may be dictated by the changing phases of a campaign.

Both as an offensive and defensive quality, speed is probably the most important factor in aeroplane design, and it is when considering the conditions that regulate the speed of aircraft that we enter the realm of theory by one of its most interesting doors.

### *Aeroplane Resistance.*

Air resistance. Motion being the consequence of force overcoming resistance, and speed being merely the measure of its rate, the basis of this discussion must necessarily be founded on the principles underlying resistance to motion in the air. And it may be said, without much deviation from the truth, that the investigation of these laws has for several years constituted the chief occupation of scientific aeronautical research.

The absolute and primary importance of such information is obvious. Knowing the resistance to be overcome, the engine power required to attain a given speed resolves itself into a problem of arithmetical simplicity. Without this knowledge, the potential capabilities of an aeroplane remain unknown: its design is sheer guess work or an expression of purely personal opinion.

Already, the resistances of a great number of forms have been tested experimentally, and the ablest mathematical minds have studied the theoretical side of the problem in all its bearings.

In England the modern starting point in a long series of carefully conducted researches was the investigation of the resistance of small square plates in a uniform current of air\* followed by similar experiments on large boards exposed to the wind.

It is self-evident that a flat plate forms the simplest model with which to commence an experimental campaign into the resistances opposed by solid forms to the flow of a current of air. Equally is it apparent that a very thin flat plate, first placed facing the stream and then placed edge-on to the stream, should afford comparisons of two extreme conditions of fundamental interest and importance. In the former case, the plate offers what is apparently the maximum possible direct obstruction. In the latter case, the resistance presumably attains its least possible value. Moreover, the mind readily imagines a marked distinction between the natures of these two resistances. In the case of the plate facing the wind, there is the effect of a barrier, or dam, causing a definite interruption of the air flow, whereas in the case of the plate edge-on to the line of motion, the fluid is parted as by a knife, and the resistance is caused by the friction of the air molecules rubbing along the surface.

If, in the first of the above described experiments, the effect of the obstruction presented by a flat plate of area  $A$  were to bring to

\* See Stanton's "Resistance of Plane Surfaces in a Uniform Current of Air," and "Experiments on Wind Pressure," published in 1907 and 1908 by the National Physical Laboratory, Bushy House, Teddington, England.

rest the air of density  $\rho$  flowing at a velocity  $v$ , then the resistance of the plate would be expressed approximately by the equation

$$\text{Force} = \text{Constant} \times \text{density} \times \text{Area} \times \text{Velocity}^2$$

$$F = C \times \rho \times A \times v^2$$

and the value of the constant would be unity.

Actually, the constant  $C$  is in no case unity. Dr. Stanton, of the National Physical Laboratory, established some years ago the following experimental values for square plates, and they are still the standard coefficients:

Small plates.  $C=0.507$ . Large plates.  $C=0.62$ .

In a more convenient form, the wind pressure on a large flat surface standing normal to the stream may be expressed:

$$F \text{ (lbs./sq. ft.)} = V^2/306$$

where  $V$  is the air speed in miles per hour.

From the variation in the above coefficients with the linear dimension of the plate, Lord Rayleigh pointed out† that the " $v^2$ " law of resistance, hitherto assumed true, could not be strictly accurate; in short, that if, as had been proved, there was a variation of  $F$  with  $l$  ( $l$  being a linear dimension of the plate), then there must also be a variation of  $F$  with  $v$  and with  $v^{\frac{1}{2}}$ .

Very great importance attaches to this result,‡ because exigencies of time, space and economy make it necessary to use models in experimental research. It is highly important to be able accurately to adjust the scale effect when applying the results of such research to full-sized machines. For rough approximations, however, the  $v^2$  law is commonly regarded as sufficiently correct to cover moderate speed ranges.

Turning to the edge-on position of the thin flat plate, the  $v^2$  law is found definitely not to apply, nor is the resistance even directly proportional to the area exposed to contact with the stream. To Dr. Zahn the credit is due for experimentally establishing the law of frictional resistance in the air.¶ His fundamental equation is as follows:\*

$$\text{Force} = \text{Constant} \times \text{Area}^{\frac{2}{3}} + \text{Velocity}^{\frac{1}{2}}$$

$$F = k \times A^{\frac{2}{3}} + V^{\frac{1}{2}}$$

When  $F$  is the total resistance of both surfaces of a plate measuring  $A$  square feet in single surface area; the value of  $k=0.0000082$ .

There is thus no constant relationship between the face pressure and surface friction of a plate, but it may help to fix ideas to calculate a particular case, e.g., for a single face area of 1,170 square feet, moving normally at a uniform speed of 80 m.p.h., the ratio of single-face pressure to double-surface friction is 300 to 1.

Such a vast difference very forcibly draws attention to possible economies in the disposition of surfaces that have to be driven through the air. It is apparent that the case of the flat plate facing the wind must be avoided at all costs, and the conditions represented by the plate edge-on approximated to as nearly as possible.

(To be continued.)

† See "Technical Report of the Advisory Committee for Aeronautics," Vol. 1909-10, page 38.

‡ The symbol  $\nu$  denotes what has been termed the kinematic viscosity of the fluid. It might better have been expressed as the Specific Viscosity, for it is viscosity divided by density. Its dimensions are  $L^2 T^{-1}$ .

§ Commonly referred to as the law of dynamical similarity. For charts illustrating the change in the coefficient with change of velocity over a wide speed range, see the second "Wilbur Wright Memorial Lecture" by Dr. R. T. Glazebrook, C.B., F.R.S., published in the *Aeronautical Journal*, Vol. XVIII, p. 276. In the Technical Report, Vol. 1912-13, p. 74, it is pointed out that "no serious correction is necessary to the lift values obtained, but that from 15 per cent. to 20 per cent. should be added to the maximum lift/drift ratio recorded to make them applicable to full-scale aerofoils."

¶ For Dr. Zahn's original paper, see "Atmospheric Friction on Even Surfaces," published by the Philosophical Society of Washington.

\* This is the form in which the formula is given in the "Technical Report of the Advisory Committee for Aeronautics." See Vol. 1911-12, pages 33, 34.

## LIGHTER THAN AIR.

### She was a Good Sport.

THE lady was taking a ride in one of the open-front machines, where there is only a stick as foot-rest. Her skirts had been tied round her limbs before starting, but were working loose, and the air was filling the kinks. The ambidexterous pilot undertook to control the machine with one hand and call her attention to what was happening with the other. He first pointed to the inflated garments, then described a parabolic line with the one free hand. She shook her head; and he thought her face was somewhat flushed, and he realised that there were possibilities of his being misunderstood. Then he looked for a suitable landing-place and cut off the motor.

"It is ballooning," he remarked, as they glided down, alluding to the inflating garments.

"Would make good parachuting," she acknowledged, quickly.

"Good sport!" he exclaimed; and, turning on the motor, he straightened up and made for a pink cloud that was lazily floating in the azure expanse. A woman who could contemplate the possible use of her skirts as parachutes in case of a fall deserved an extra long ride; and he gave it to her.—*Aerial Age*.

FINANCIERS should feel at home in the Air Service, where a good balance is secured by careful banking.

! ! !

THE COOK: "Sir! Sir! There's a Zep'lin outside, and if you don't come wi' the keys of the cellar, we'll all be in— in— Heaven in a couple o' minutes!"

THE DEAN: "God forbid!"

! ! !

"WHEN LONDON SLEEPS' (Last Nights)." Nonsense! We have a lot more faith in our Anti-Aircraft Corps than that.—*London Opinion*.

! ! !

### Those Hen Monoplanes Again.

JAGWELL: "What makes that hen in your back yard cackle so loud?"

WIGWAY: "Oh, they've just laid a corner-stone across the street, and she's trying to make the neighbours think she did it."

## AIRCRAFT AND THE WAR.

A REUTER message from Rome on October 25th stated :—

"This morning Venice was the object of a fresh attack by the enemy, three Austrian aeroplanes dropping several bombs at 8.40 a.m. Three people were slightly injured. The material damage done was very slight.

"The newspapers express profound indignation at the raids. The *Giornale d'Italia* remarks: 'The pious Emperor and the devout Archdukes will no doubt be glad to know that their fury has descended on a church.'"

A Reuter message from Petrograd on the 26th, stated :—

"A Russian giant aeroplane has dropped bombs on a village to the south of Baronowitschi, occupied by the Staff of a German infantry division and German supply columns. Squadrons of four and of five Albatros aeroplanes respectively attempted to fly over Minsk, but were driven off by the Russian artillery. They dropped a dozen incendiary bombs on the outskirts of the town. One Albatros aeroplane was brought down."

The *Daily Mail* correspondent at Hazebrouck, writing on October 26th stated :—

"On Tuesday morning the British guns succeeded in bringing down a Taube which was flying over the Armentieres region. Hit by shrapnel, the German aeroplane had to descend. It is reported that the occupants were made prisoners."

Writing to the *Daily Telegraph* from Milan on October 27th Mr. A. Beaumont said :—

"The greatest indignation is felt all over Italy at the latest Austrian vandalism in Venice. The beautiful painting of Tiepolo on the ceiling of Di Scalzi Church was completely destroyed, without hope of any possible restoration, and only a few bare fragments remain. The bomb dropped by the aviator struck the roof almost near the centre, and exploded evidently before it had entirely passed through the ceiling, thus causing much greater damage, as there was no great resistance from the air.

"Indignant protests have been published from many eminent art lovers, and the Pope himself appears to have been very much affected.

"The Minister, Signor Barzilai, went to Venice specially, and visited the church with the mayor and a number of art experts. They found the floor of the church littered with plaster and fragments of ceiling, and that the beautiful work of art was entirely pulverised."

The following message from its Alexandria correspondent was published by the *Temps* on the 27th ult. :—

"A French seaplane flew over Beirut as far as Mount Lebanon in order to attack the railway between Beirut and Damascus. The seaplane was damaged by Turkish fire, but was able to drop bombs, killing many soldiers who were massed on the roof of a house."

The *Morning Post* correspondent at Copenhagen, writing on October 27th, said :—

"A private message from Riga states that Zeppelins and aeroplanes are daily throwing bombs; the inhabitants nevertheless are composed, and nobody doubts that the Germans will be repulsed and will never succeed in taking the fortress."

In a message from Petrograd on October 28th Reuter's correspondent said :—

"It is reported that another German aeroplane has been brought down near Mitau, both the aviators it contained being killed."

The *Morning Post* correspondent at Petrograd, writing on October 28th, said :—

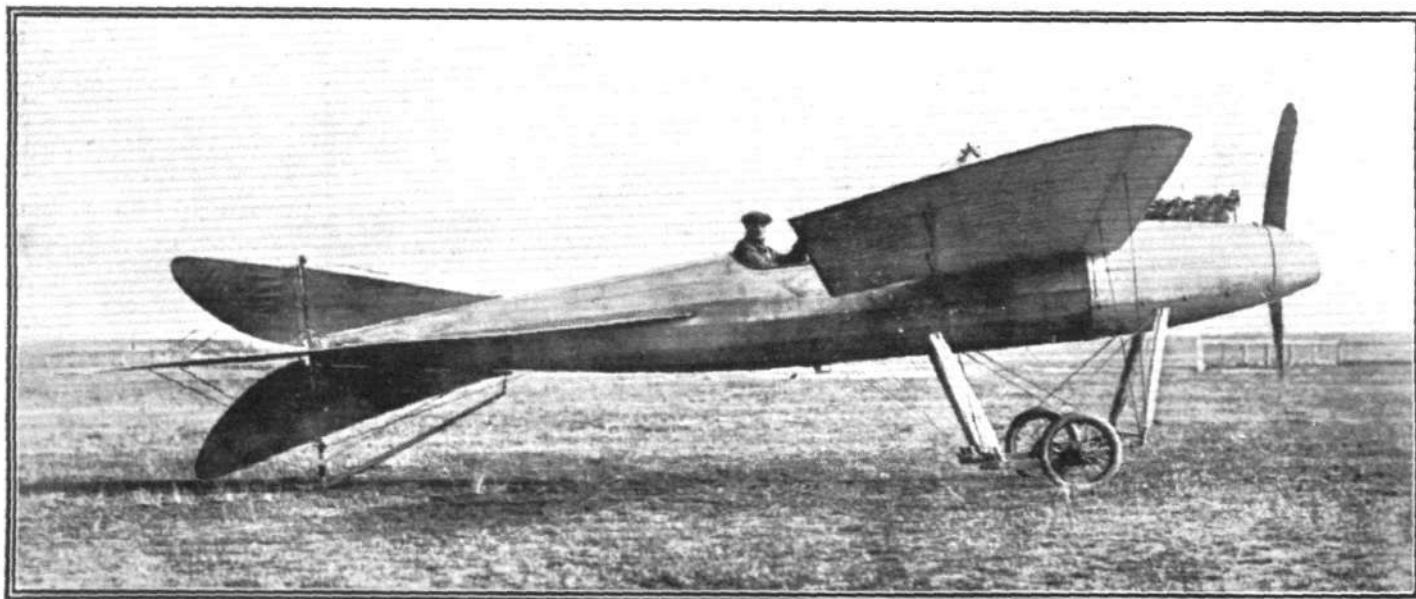
"Aerial fighting in this region (Riga) grows in intensity. The Germans have launched a number of aeroplanes painted a colour which renders them invisible even at comparatively low altitudes. This has been necessitated by the admirable practice made by the Russian artillery against the German aeroplanes. The Russian Dreadnought planes continue the exploding of military stores far in the rear of the German fighting lines. Mitau, which the Germans have made their principal forward base, has suffered very severely from attacks by the Russian monster planes."

The *Times* correspondent in the Balkan Peninsula writing from Bucharest on October 28th regarding the bombardment of Varna, said :—

"At the beginning of the bombardment four seaplanes made their appearance, dropping bombs on the large new flour mills and the railway station, where 201 soldiers were killed. The seaplanes also attacked Euxinograde, where the summer residence of King Ferdinand is situated. The wireless telegraph station on the heights above the town was damaged."

Writing from Bucharest on October 30th regarding the shelling of Varna by the Russian Fleet, the *Morning Post* correspondent said :—

"Russian hydroplanes dropped bombs on Turkish troops quartered to the west of the town, and also signalled the position of the camp in order that the squadron might bombard it."



**A GERMAN "TORPEDO" MONOPLANE.**—In spite of the fact that the German authorities have practically abandoned the monoplane type for active service, it appears that German designers are still experimenting with *Eindeckers*. The machine shown in the above photograph has evidently been designed for speed, judging from its excellent streamline body. The way in which the engine has been all but hidden away inside the covering is, of course, the result of an attempt to reduce head resistance to a minimum, as is also the nose piece fitted over the boss of the propeller. Strangely enough, the under-carriage is not of the simple "Vee" type that is so much favoured by German designers. Note the symmetrical rudders and tail plane.



ALL communications in connection with this section should be addressed to the Model Editor, "FLIGHT," 44, St. Martin's Lane, London, W.C. Correspondents are requested to write on one side of the paper only.

### Paper Models.

MR. H. MAJOR writes as follows:—

"As suggested in your issue of October 16th, 1915, I am sending scale drawings of a small paper monoplane, which I have found to give excellent results. The scale given only applies to diagrams illustrating wing construction, side elevation and plan view.

"Materials to be obtained before commencing are:—

"1. A few sheets of hard bank paper; if this not to hand, fairly stout notepaper may be used.

"2. A small piece of thin tinned sheet iron.

"3. A short length of iron wire of about 25 S.W.G.; a thin hairpin will serve the purpose.

"4. A piece of wood 8 ins. by  $\frac{1}{8}$  in. by  $\frac{1}{16}$  in., to form the backbone, and another 5 ins. by  $\frac{3}{8}$  in. by  $\frac{1}{16}$  in., for the screw.

"5. A few small glass beads, the smallest procurable.

"6. A thread or so of silk; a tube of liquid glue; 10 ins. of  $\frac{1}{8}$  in. elastic; scissors, &c.

"Take the wood intended for the backbone, and taper slightly towards each end, leaving a full section in the centre. The rubber hook should be fitted at one end, as illustration C and C1, in such a manner that it will allow the rubber to run along the thickness of the wood (not the width). The piece of tin should then be taken and drilled, so as to allow the wire to just pass through the hole.

"The metal may now be cut with the scissors to the shape B, and bent at the dotted lines as in B1, this bearing to be fitted to the

"To construct E, obtain some stouter paper, and cut to shape and dimensions illustrated. Mark out in pencil the wing section, as shown by the fine dotted lines, and fold at the thick dotted lines. This will form a triangular framework, to which the wings may be glued along the pencilled section as D1 to E1. Now cut F from thin paper and glue to backbone as F1, after which the whole may be glued together as J, allowing a free passage for the rubber (which will run above the frame) through the triangular section. The tail construction should, I hope, be self-evident from the diagrams A1 and G1. The flaps in this case are glued down without the insertion of cane spars. The tail, G, is attached to the outrigger in much the same manner as F1, the rudder being glued down by flaps to the top of the same.

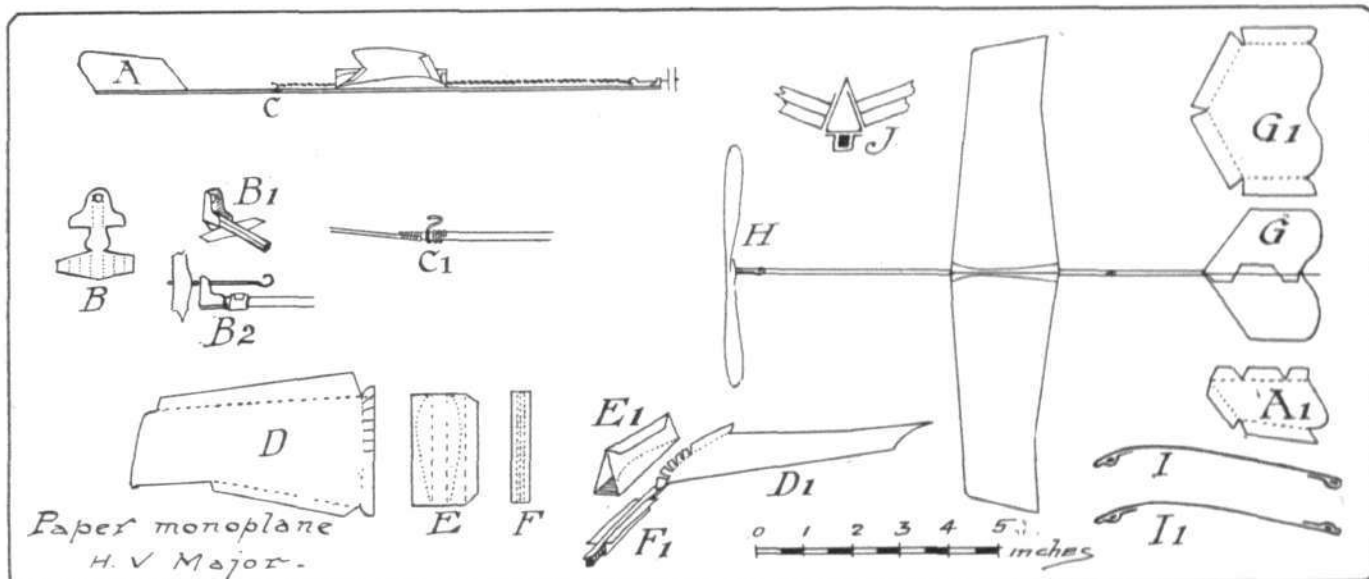
"This completes construction, but the beginner should not expect distances in excess of a maximum 150 ft. to be flown by this model. After some experience has been gained, modifications should be carried out, on the lines of the following:—

"Lengthen the backbone, so as to allow the use of a greater length of rubber.

"Fit rubber that is normally half an inch longer than the distance between the hooks.

"Glue the rear spar to the top surface of the wing, and lap paper over accordingly, as I1.

"Endeavour to do without the negative angle of the tail, though at the same time retain the longitudinal stability.



opposite end of the backbone, and the flaps folded over as B2. A thin piece of cane, 4 ins. long, should be taken and bound to the backbone at C, in the manner shown in C1. This is set at a slight upward angle, and is to carry the tail.

"The tractor screw may now be carved. Mark the wood in the centre of its length and width, and bore a hole with a needle through the thickness. Carve the propeller so that the angle of its blades diminishes towards the tips. Sandpaper till almost as thin as paper and coat with liquid glue. This will soak in and dry with a rough surface, so continue coating with glue, until a varnished effect is obtained. A screw treated in this manner will very rarely break, and when thoroughly dry, is not rendered sticky by the heat from the fingers. Pass a piece of wire 2½ ins. long, through the hole in the boss, and bend over at the end as B2. Place two beads on the shaft, and bend same at the other end into a hook for the rubber.

"The wing should be sketched out on paper first as D, but drawn to full scale. Cut both wings out at the same time, from a double thickness of paper, and fold at the dotted lines. The flaps at leading and trailing edges to be lapped under, and carefully glued down over two very thin cane spars.

"The wing may now be given a curve as in I, which may be produced by rolling the leading half of it round a pencil. Now bend the flaps at the root of the wing upwards, and the result should look similar to D1.

"When trying to obtain a maximum length of flight, lubricate the rubber with soap jelly (or any other suitable substance).

"The rubber should stand about 500 winds, and should last up from 15 to 20 seconds."

### UNAFFILIATED MODEL CLUBS DIARY AND REPORTS.

Club reports of chief work done are published monthly. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

**Finsbury Park and District (66, ELFORT ROAD, Highbury, N.).**

*Monthly Report.*—Last month some good flying has been put in by nearly all members, although the amount was rather less than in the previous months. All machines in use have been single-screw r.o.g. tractors, a Handley-Page type by A. Richards, a machine possessing great stability, both laterally and longitudinally; a Morane by Mr. F. E. Rayner; a Morane by B. H. Barnard, with a triangular chassis à la Handley-Page mono. Messrs. S. Hex, W. Hardinge, and S. Coleman have been flying ordinary square-wing monos, the latter's being a light-weight mono., all flying very well indeed. On Oct. 23rd experiments were carried out by several members for the effect of explosions on the flights of models. The ordinary multiple crackers were used for this purpose, fastened on the chassis and lit just before the models were launched. Immediately after each explosion the models seemed to acquire a momentary lift and to rock slightly laterally, owing no doubt to the plane encountering the disturbed air. Mr. R. Mullins, who joined the 6th City of London Rifles as a private, just over a year ago, has been granted a commission, and is now a 2nd Lieut. R.E.



## Liverpool Aero Research Club (62, CEDAR GROVE, LIVERPOOL).

**Monthly Report.**—The weather last month was far from favourable, rain on October and preventing work. October 9th, with better conditions, T. W. Bennett treated an interested audience to some very good h.l. arrow-plane canard flights, showing during its performance some fine wind-fighting qualities, additionally putting some fair work on his r.o.g. canard biplane. October 16th, the arranged biplane r.o.g. trophy competition had to be postponed on account of heavy fog. Notwithstanding this, however, some very passable work was accomplished with a single r.o.g. tractor mono. by G. H. Kilshaw. The latter's r.o.g. biplane and T. W. Bennett's same type model were put through short flights. We were pleased to note the presence of Mr. J. Scott at this meeting. No machines were pushed much in their performances, as the heavy fog rendered locating models too difficult for long flights. October 23rd, owing to extremely high winds, r.o.g. work was impossible, T. W. Bennett, however, accomplishing some very sound h.l. arrow-plane flying. October 30th, some very good work with r.o.g. machines with improved weather, the best flights being on the G. H. Kilshaw models—a tractor and a twin-pusher biplane, B. Tear attending with a latter type machine.

## Scottish Ae.S. Model Ae.C. (5, DOUNE QUADRANT, GLASGOW).

**Monthly Report.**—On 9th October, Mr. G. Pinney and Mr. J. C. Balden were at Paisley testing a c.a. model and an r.o.g. respectively. The committee have decided that no competitions be held or "certificates of record" be issued until the end of the war. The club history, which is now being written, will not be finished for some little time, as it has been agreed to issue it in the form of a book, complete with photographs, drawings, and all data available. In future each year's data will be added, so that members of the future will be able to review the doings of the club in the days gone by. The secretary will advise members by post-card of the next flying meeting.



## The Austrian Bombs on Venice.

THE following semi-official statement was issued in Rome on October 31st:—

"Enemy bulletins assert that the dropping of bombs on Venice on the night of October 25th, and on the following day, was carried out by Austrian aeroplanes as an act of reprisal, our aviators having bombarded Trieste. This assertion is false in substance and equivocal in form.

"The truth is that on the afternoon of October 24th our seaplanes bombarded, in conformity with the customs of war, establishments at Muggia and Pirano, where war material was being made, but not the city of Trieste, which is at least four kilometres distant from the nearest of the two bombarded localities. The Austrian machines, on the other hand, dropped bombs on buildings in the centre of Venice and even on the Piazzetta San Marco, damaging a church and other edifices to which no one could attribute a military character, thus committing an offence not only against the most elementary rules of humanity, but against art."

## The Injured in Zeppelin Raids.

REPLYING to Sir E. Cornwall in the House of Commons on Tuesday, Mr. Asquith said that the total number of persons seriously injured in this country by Zeppelin raids was 333, but the figures for those permanently injured were not available. No direct payments by way of relief in respect of personal injury or damage to property had been made by the Government since the introduction of the Government scheme of insurance on July 19th except as provided by that scheme in respect of insured property. In view of the existing agencies for insurance against personal injuries, it was considered that there was no ground for the grant of compensation by the Government. The National Relief Fund was available for the purpose of affording assistance in suitable cases.

## Croydon Guardians and Aircraft Risks.

THE Croydon Board of Guardians last week reversed their decision of a month ago not to insure their property against damage by hostile aircraft. There were only three dissentients.

## A "Christening" Function at Richmond.

IT is always gratifying to see a newcomer into the Aviation Industry "make good," especially when the initial start was made on a very modest scale. Such is the case of the Whitehead Aviation Company of Richmond, which was formed some months ago and which has, under the able guidance of its managing director, Mr. J. A. Whitehead, done exceptionally well in the way of aeroplane construction under none too favourable conditions. However, by good organisation of the resources available and by taking the best possible advantage of the space at hand this firm has just finished its first machine.

By way of celebrating this event a little informal "christening" ceremony was arranged for Sunday last, at which a number of guests were present. Among those invited were Mr. Lloyd George, the ex-Lord Mayor of London, the Mayor of Richmond, Colonel Maude, Doctor A. Lynch, M.P., Mr. L. Blin Desbleds, and a number of Mr. Whitehead's personal friends. The function was very successful, Mr. Whitehead's little daughter Hélène after whom the machine was named, breaking a bottle on the nose of the machine, assisted at the last moment by her father. At the luncheon which followed a telegram was read from Mr. Lloyd George expressing his regret at being unable to attend the ceremony, and some speeches, during the

afternoon, in which congratulations were offered to Mr. Whitehead and the firm, helped to wind up a very pleasant gathering of well-wishers to the Whitehead Co. in particular and aviation generally.

## A Special "Wood" Line.

MESSRS. JOSEPH OWEN AND SONS, of 199, Borough High Street, have, we hear, just landed by steamship "Feliciano" 76 standard clear silver spruce, 4 in. to 6 in. thick and 18 feet upwards long. The parcel is, moreover, we understand, in specially good seasoned condition.

## The Sunbeam Motor Car Co., Ltd.

A VERY remarkable state of prosperity, upon which we congratulate the directors and the shareholders, is disclosed in the report of the directors of this company for the year ended August 31st, 1915. It will be remembered that the Sunbeam Co. are manufacturing aero engines for the Government, and therefore the welfare of such an important concern as the Sunbeam is of vast interest to all associated with the future of aviation. In the report to hand it is seen that the profit for the year, after paying all expenses of management and allowing for depreciation and income tax (but before providing for directors' remuneration), amounts to £241,356 10s. 4d. After adding £20,111 2s. 1d., the balance from last year, and deducting £900, the half-yearly dividend on the preference shares paid in April, there is a balance of £260,567 12s. 5d., which they recommend shall be appropriated as follows:—Pay the balance of dividend on the preference shares, £900; pay a dividend of 15 per cent. free of income tax upon the ordinary shares, £36,000; pay a bonus of 2s. per share free of income tax upon the ordinary shares, £24,000; place to bonus fund, etc., £4,000; place to reserve (bringing this account up to £220,000), £120,000; and carry forward (subject to such an amount as may be voted to the directors for remuneration for the past year), £75,667 12s. 5d. In December last Mr. L. Coatalen and Mr. W. M. Iliff were appointed joint managing directors on the retirement of Mr. T. Cureton from that position.



## NEW COMPANY REGISTERED.

**Macfie and Co., Ltd.**, Hampden House, Kingsway, W.C.—Capital £5,000, in 1,000 deferred shares of 1s. each and 4,950 10 per cent. participating preferred shares of £1 each. To carry on the business of manufacturers of fittings for aeroplanes of all types and all heavier-than-air flying machines, dealers in appliances, &c. First directors, H. F. Smallman-Smith, R. F. Macfie, and G. S. Littlejohn.



## PUBLICATIONS RECEIVED.

*Recapture and Expansion of British Trade: Internal-Combustion Engineering.* London: International Correspondence Schools, Ltd., Kingsway, W.C.

*The Lord High Admiral.* By L. Cope Cornford. London: Williams and Norgate. Price, paper boards, 2s. net; cloth, 2s. 6d. net.

*Heredity: New Psychological Theory.* By J. Scouller. Sydney, N.S.W.: Shipping Newspapers, Ltd., 16, Bond Street.



## Aeronautical Patents Published.

Applied for in 1914.

Published October 28th, 1915.

20,607. D. MAGGIORA. Apparatus for destroying or upsetting aircraft.

Published November 4th, 1915.

21,312. E. R. CALTHROP. Parachutes.

Applied for in 1915.

Published October 28th, 1915.

4,351. A. G. NEVILLE. Steering wheels for aircraft.

Published November 4th, 1915.

637. W. AND T. AVERY, LTD., AND A. W. BROWN. Means for balancing propellers.

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